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THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston, March, 1890, with the following objects; The advancement of sanitary science; the promotion of better organization and co-operation among local boards of health, and the uniform enforcement of sanitary laws and regulations

THE JOURNAL OF THIS ASSOCIATION has for fifteen years faithfully reflected the views of the public hygienists of Massachusetts. With the November issue of the year 1904, the encouragement received from many hygienic quarters induced the Association to undertake the expansion of the Journal to a national standard, with the co-operation of many noted sanitarians as editors. A new title was selected, while the older and well-established title was retained also.

The dates of publication are FEBRUARY, MAY, AUGUST *and* NOVEMBER *of each year.*

THE JOURNAL will contain the papers read at the meetings of the Association, papers contributed by hygienists, reports of the discussions, editorials, abstracts, reviews and hygienic notes of professional interest. Subscription rates, $1.00 per year. Reprints furnished at cost price.

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All communications concerning the ASSOCIATION should be addressed to the Secretary of the Association, JAMES C. COFFEY, CITY HALL, WORCESTER, MASS.

All bills not relating to the Journal, and MEMBERSHIP DUES $2.00 per year), should be sent to the Treasurer of the Association, DR. JAMES B. FIELD, 329 WESTFORD ST., LOWELL MASS.

EDITORIALS.

THE REGULATION OF THE MILK SUPPLY OF GREAT CITIES.

So long as health authorities concerned themselves entirely with the chemical purity of milk there was little real difficulty in deciding what restrictions should be enforced. No one protested against the rule that milk should not be skimmed or watered. The use of disinfectants was defended by few, and even the addition of harmless substances to make the milk appear richer was objected to by most as a fraud.

When it came to be recognized that the transmission of scarlet fever, typhoid fever, diphtheria and tuberculosis through milk was not infrequent and that an unadulterated but dirty milk excited dangerous diarrhoea in infants it became apparent that conditions on the farms, the methods of shipping and the bacterial contents of the milk must be looked into, since they were of even more importance than the substitution of water for milk or the addition of gelatin to cream.

What has seemed essential to protect the consumer has frequently conflicted with the interest of the producer or imposed too much cost on the city. All who have been interested in the milk supply of cities will admit that it is a most difficult matter to decide how pure and well inspected a milk supply it is wise to attempt.

The great territory from which the milk supply of large cities is taken adds to the difficulty of carrying out proper regulations.

Conditions at the farm can only be properly learned through inspection, and the city or state should employ enough inspectors to visit each farm at least once during the year. If this visit is made at an unexpected time, or when a complaint is received, it will create a wholesome fear among the slack, especially if severe penalties are inflicted when grossly improper conditions are discovered.

It is generally considered by bacteriologists that the most serious contamination of milk is through the addition of the contagion of scarlet fever, typhoid fever and diphtheria. Tuberculosis is also known to be carried by milk. Next in importance are the bacteria derived from diseased cattle, such as those suffering from inflamed milk ducts, enteritis, or sepsis. These bacteria are indeed deleterious, but not as a rule capable of transmitting diseases beyond the one drinking the milk. The ordinary bacteria of milk, which are derived from the cow manure, hay dust and other sources, are even less harmful, and only render milk distinctly dangerous to infants when in considerable numbers, and even then chiefly because of the chemical changes they produce.

The city should insist absolutely that the officer in charge of milk inspection should be notified when a case of suspected typhoid fever, scarlet fever or diphtheria occurs on a farm supplying milk, and that no person coming in contact with such cases should have anything to do with milking or bottling the milk.

It should also demand that the water used in the milking room and barn be above suspicion. A decently clean condition of the barns, cows, milkers and dairy rooms should be insisted on.

The question as to whether tuberculous cattle should be allowed to supply milk to cities is one of great importance, and is also a very difficult one to answer. There is now no doubt that bovine tuberculosis is transmitted to children. It is, however, extremely probable that the percentage of tubercular children infected in this way is small. Cattle having appreciable tuberculosis of the udders are the most dangerous, and those having pulmonary tuberculosis the next. There can be no doubt that such cattle should be destroyed, both because of their danger to children and perhaps adults, and also because of their danger to other cattle. The majority of farmers would agree to this. The difficulty is to decide what is to be done about cattle which have very slight tubercular lesions, which can only be detected through the tuberculin reaction or autopsy. At present 20-30 per cent. of cows have such tuberculosis. Probably more than half of these never develop appreciable lesions. The farmer strenu-

ously objects to having them killed and he has succeeded in impressing his opinions on others, so that at present almost no restriction is placed upon the sale of milk from tuberculous cows.

For the sake of the cattle as well as the men, this is not a desirable condition. The health authorities in cities should definitely state that so soon as practicable they will insist on milk from cattle free of tuberculosis. One possible means to this end would be to insist on the tuberculin test of all herds supplying the milk. Those that reacted, but showed no physical signs, would be left until their milk decreased to a point where the cow was unprofitable. It would then be sent to the butcher the same as any other cow, and if the carcass passed a thorough examination it would be sold as food; if not, it would be utilized for other purposes. Many farmers make a practice of sending their cows each year to the butcher, instead of holding them over. They consider it the most economical method for all except high grade cattle. Of course the fact that these cattle have reacted has in no way made them tubercular. The test has revealed it, and they are no worse for food than they were before being subjected to the test. In this way all tubercular cattle would be eliminated in a year or two, and no more would be used for food than at present.

Another matter that needs regulation is the temperature at which milk is kept. The cleanest milk when kept at a high temperature soon sours. After much investigation a temperature of 50 degrees Fah. has been decided to be low enough to keep the milk bacteria from increasing rapidly, and one easily maintained by the farmer, railroad and dealer. In some cities, as New York, for instance, last summer large quantities of milk were dumped in the gutter because the temperature was found to be five or more degrees above the limit set. Some objected that much of this milk was good. That was true, but the point was it would have been better if it had been kept cool, and there was no way of enforcing a necessary and reasonable law except by making examples of those who wilfully tried to break it.

The difficulty of procuring funds enough to employ sufficient inspectors to look after the production and shipping of milk has

caused the laboratories to try and devise means which will detect errors.

Thus the number of bacteria in samples of milk is estimated. Some cities make it illegal to sell milk containing over 500,000 bacteria per c. c. This regulation is made because there is no excuse for milk containing on the average 500,000 bacteria. It must have been produced in a filthy way, or shipped warm or be very old to have this number. It is true that such milk would not harm an adult or when sterilized seriously injure the average infant but it is decidedly worse than it should be, and, if produced so carelessly, it is probable that it would not be safeguarded from the germs of the contagious diseases of man or cattle. Another test reveals under the microscopic pus cells and streptococci, and thus indicates that the milk of diseased cattle is being sent.

The bacterial count and the microscopical examinaton are thus detectives ready to point out unhygienic methods. For a similar purpose samples are taken by the chemist, and thus the extraction of cream, the addition of water or the use of formaldehyde and boric acid are discovered.

The fact that it is impossible at present to provide a great city with as safe and pure a milk as is desirable has started a movement to make accessible to all a very pure supply, which is produced and handled by the best kown methods. As a rule, a society of physicians works in connection with the Health Department of the City and through trained inspectors supervises the production and sale of the milk. It guarantees the purity of the milk and its freedom from excessive numbers of bacteria and from all disease bacteria.

The farms supplying this milk act as examples to all adjacent farms and help to raise the general standard. Over 10,000 quarts of such milk are being produced daily.

W. H. PARK.

PLUMBING REFORM.

The object of plumbing, as the word is here used, is the speedy removal of various well-known wastes from houses and other buildings. Their removal is demanded by health and convenience, although in the minds of most people the order is reversed. As a matter of convenience, no one is greatly concerned about the method of removal so long as it is speedy, complete and reasonably cheap. The same might be said from the health viewpoint, were it not for the belief that the exit for the wastes may become an inlet for harmful gases and, as many still think, for various disease germs. Extremists even go so far as to speak of defective plumbing as "a breeding place for all manner of disease germs."

The early alarms over so-called sewer gas, combined with the later fears that arose with the adoption of the germ theory of disease and its relations to house sewage, led to the development of many and diverse traps and a forest of vent and back vent pipes that might well have been the despair of all sane men except plumbers, and which were a source of trouble and grave doubts to the most sensible and honest of that craft.

Many cities and towns, including some that one would least expect it of, are still enforcing or trying to enforce plumbing ordinances drawn in the days when "sewer gas," trap siphonage and "breeding places for disease germs" were still the nightmare of most persons who pretended to be posted in household sanitation. But fortunately for the public health and the private pocketbook a respectably large and a constantly growing number of communities and individuals now realize that a plumbing system greatly simplified as to traps and back vents lessens rather than increases the dangers, both imaginary and real, of house plumbing, besides effecting economies which make possible better material and workmanship for the really essential parts of the plumbing system. Ventilation is still thought well of; in fact, so well that main or running traps are being omitted on house drains and thus the house and the street sewer, as well as the

house piping, are being ventilated through soil pipes and their extension to and through house roofs.

Among the reasons, not already suggested, for these changes in opinion and practice is the growing acceptance of evidence that disease germs are rarely disseminated through the air of sewers and house plumbing systems; that the air in soil and waste pipes, as a rule, is as bad as or worse than that in sewers; that if only ample ventilation of both the house piping system and the public sewerage system can be afforded by omitting main traps and ventilating through the soil pipes and their extensions there will be little foul air in sewers, and particularly in well constructed and operated modern sewers; and that through air currents and otherwise back venting pipes are liable to aid more than retard the loss of water seals in traps.

The modern art and science of plumbing makes for simplicity, solidity, accessibility, good material and workmanship, and the fewest possible joints. The best plumbing and sewerage together aim to remove all wastes before offensive decomposition can begin, to reduce to a minimum the number and size of places for the deposit of organic matter and to still further reduce such deposits as do occur by flushing and cleaning, and finally to provide such ample ventilation as will prevent the accumulation of foul odors in public and private sewers and in house plumbing systems.

I have not written of the details of plumbing work and fixtures because they are generally well understood by the best sanitarians and plumbers. The underlying principles of modern plumbing are also pretty generally understood by the most progressive sanitarians and plumbers, but unfortunately many local boards of health are still composed of or controlled by men of the old school, who gained their ideas of plumbing and the other older branches of sanitary work when filth and vile odors were supposed to be the sources of disease and air the chief means for its spread. We now realize, or are beginnings to realize that the individual is the source of communicable diseases and that such diseases must be suppressed at their source. The day will come when comparatively little disease-infected waste matter will

find its way into the sewers without first having been disinfected and when all our sewage wastes will either be purified or else discharged into bodies of water where they can do no harm—in either case being conveyed from the plumbing fixture to the point of treatment or other disposal so expeditiously and perfectly as to subject no one to risk.

M. N. BAKER.

WATER FILTRATION VERSUS WATER PURIFICATION.

A casual comparison of the water supplies of our leading cities with their respective typhoid fever death rates will show that water filters and typhoid epidemics have existed in some of our municipalties at the same time. Indeed, examples of this may be had with little seeking.

In England as in the United States, the annual high-point in the typhoid morbidity is during the fall, while in some parts of London it occurs in the middle of the winter. Corfield has shown that the London epidemic occurred whenever the operation of the old-fashioned, open-flow filters was interfered with by the accumulation of ice, which tended to prevent the proper cleansing of the filters and therefore reduced their bacteriological efficiency.

The filters at Altona, which in 1893 protected the city against the cholera epidemic which scourged the adjoining city of Hamburg, failed to purify the water during the winter of 1894 because the sand surfaces became frozen while the filters were being scraped, as the result of which loss of efficiency Altona suffered an epidemic.

In St. Petersburg the filters were not adapted to the character of the filtered water, and during times of high turbidity the quality of the effluent deteriorated, and on one occasion at least an epidemic was traceable to this cause.

In the United States previous to 1895, the introduction of water filters was not as a rule accompanied by a marked reduc-

tion in the typhoid fever death rate, although there were notable exceptions at Lawrence and a few other well-remembered places.

Several epidemics have followed the interruption of filtration for the purpose of making repairs to or changes in other parts of the water works, thereby permitting unpurified water to be supplied to the consumers for a longer or shorter period. The epidemic at Butler, Pa.,—the greatest on record—is a case in point. This city was supplied with unfiltered polluted water for about two weeks, during which time the seeds of the great epidemic were sown. Butler grew very rapidly, which made frequent changes in the pumping machinery necessary. The filter plant was shut down while connections were being made with new pumps.

Many of the failures of filters have been where mechanical filters have been used with insufficient coagulant. Many of these mechanical filters were installed solely for the purpose of removing turbidity from the water. Later on the unfiltered water became polluted and filters designed and operated as clarification plants were inadequate as purification plants.

We have multiplied these examples to illustrate how essential it is that the purification of all water supplies be continuous, day after day. A corollary to this is that a water supply which is dangerously polluted at any time should be purified all the time.

To accomplish continuous purification, three things are necessary,—proper design, proper construction and proper operation.

For a time there was a great deal of controversy over the comparative merits of slow and rapid or mechanical filters, the latter using sulphate of alumina as coagulant. At present, however, it is quite generally conceded that each system has a field of its own in which the other is not efficient, and that in other fields either may be employed. It is essential, however, in any case, that when necessary the water be properly treated by means of sedimentation or other processes before being subjected to filtration. The selection of the type and its adaptation to the water to be treated is the work of the sanitary expert and engineer, and consequently must be well done if good results are to be obtained. He should be careful to design a purification plant with

sufficient reserve for all conceivable emergencies, just as he would provide an adequate reserve supply for fire protection.

However, even the best designers and constructors cannot insure the proper operation of a purification plant. This depends upon the manager of the plant; therefore it is of paramount importance that he be conscientious and well trained,—if possible, one who has a knowledge of sanitary chemistry and biology, but above everything else, a man of character, capable of shouldering responsibility. To those who say that such men cannot be obtained, we reply that the railroads are quite successful in securing such men for the responsible positions of train dispatcher, engine driver and tower man.

There is no great difficulty in getting men competent to operate pumping engines costing upwards of $100,000, and it is believed that the water departments can procure the same class of servants for the operation of water filters. They may demand higher wages than those of many men now in charge of filter plants, but we are sure that parsimony along these lines militates against the continuous and efficient operation of water purification plants, and therefore against the public health.

The attainment of the results described above is quite possible; in fact, they are realized in perhaps ten per cent. of the urban population of the United States, and might be in at least sixty per cent. of the population now supplied with water of questionable quality.

R. S. WESTON.

DEATH RATE FALLACIES.

In the way of hygienic news the steadiest demand is for statistical small beer. Weekly summaries of mortality are supplied with clockwork regularity. The daily papers welcome them, and the editors of weekly medical journals would be shocked if the supply of this sort of "copy" should be cut off. When the total mortality for a given week is divided by the estimated population for some other week and the quotient multiplied by the number of weeks which do not make a year, or by the factor 52.14, or

by 52,28, in order that the answer may be compared with the strabismic answer to a similar operation in the "corresponding" week last year, thoughtful people may well ask, "What's the use?"

Greater New York has figured a death rate for 1904 of 20.32 per 1,000. It is suggested that New York has estimated her population too low in 1904. It is just as easy to figure too high a population, and the results are more satisfactory. The death rate in 1900 was 20.56; in 1901, 20.02; in 1902, 18.74, and in 1903, 18.18. The evidence of the past five years appears to indicate that New York has twice figured too high a population and three times too low a population, or, leaving the Census year out of the account, that the estimates are just as likely to fall short of as to exceed the true population, and therefore testify to the good faith of the estimaters. The progress of municipal sanitation has deprived annual death rates of much of their significance. Large sanitary works, with social and industrial progress, have given to the life history of modern cities a certain stability, releasing the health officer from his anxious scrutiny of the annual death rate, and permitting him to be concerned chiefly with the particulars of current mortality and with the special hygiene of preventable diseases. When the death rate of Greater New York makes an excursion of two points in a year, three possible explanations are to be thought of—a glaring phase of mortality, a glorious assault upon some agency of death or a slip in arithmetic.

In the last number of this Journal the writer remarked upon the unique skill of the Chicago registrar in determining the causes of death. In 130,000 consecutive instances not one death failed to be recorded under a known cause. The explanation is perhaps furnished by Mr. Samuel Hopkins Adams in his recent excellent study of tuberculosis, published in *McClure's* for January, 1905. Mr. Adams says that Chicago physicians do pretty much as they please in respect to notifications of all sorts, and that the Health Department depends for information concerning causes of death more upon undertakers than upon physicians. Of course clear and positive statements concerning causes of death are of first importance in mortality registration, and such state-

ments are more easily obtained from undertakers than physicians. In the matter of diagnosis the undertaker is free from the scientific skepticism which sometimes embarrasses physicians.

The mortality reports of undertakers are in one respect generally better than those of physicians, for the undertaker can always testify as to the fact of death, while the physician often certifies without having ascertained that death has indeed occurred. Some two years ago a London physician was called at night to a medical student, who appeared to be extremely ill, so ill indeed that the physician was not surprised to hear in the morning that the young man was dead. A stranger called upon the doctor, and, stating that he was a brother of the deceased student, asked for a certificate of death, which the doctor forthwith furnished. It presently transpired that the sick student and the bereaved brother were one and the same individual. The motive of this remarkable impostor was to defraud an insurance company.

JOHN S. FULTON.

JANUARY ANNUAL MEETING

OF THE

Massachusetts Association of Boards of Health.

The annual meeting of the Association was held at the Brunswick Hotel, Boylston Street, Boston, Friday, January 27, 1905, with luncheon at 1 o'clock P. M., with Dr. Walcott, President of the Association, in the chair.

The Chair appointed as the committee upon nominations for the ensuing year, Professor Sedgwick, Dr. French and Dr. Palmer.

THE PRESIDENT: It will be remembered by the Association that since we met here at an annual meeting, the Second Vice-President of this Association, Dr. Samuel W. Abbott, has died. He had been in your service since, I think, the beginning of this society. He had served here, and he had served everywhere, faithfully, quietly and successfully. It is moved that

a committee be appointed of this Association to prepare resolutions to be entered upon the proceedings of this Association. Is it your pleasure to appoint such a committee? If so, will you signify it by saying aye?

(Response, "Aye.")

THE PRESIDENT: How shall that committee be appointed?

(Response, "By the Chair.")

THE PRESIDENT: The Chair will then appoint Dr. Emerson of Springfield, Mr. Coffey of Worcester, and Mr. Newcomb of Salem, to prepare the resolutions.

Your Executive Committee recommends for membership in this Association the following named gentlemen: Alexander M. Wilson, of Brookline; Dr. Carroll H. Idam, of Lawrence; Dr. Albert S. Whittemore, of Boston, and Mr. W. H. Hemenway, of Brookline.

(These gentlemen were duly elected.)

THE PRESIDENT: The report of the Treasurer is now in order. Dr. Durgin, I understand, will read the report of the treasurer.

DR. DURGIN: Our treasurer, Dr. Field, is unavoidably absent today and has asked me to read the following:

ANNUAL REPORT OF THE TREASURER FOR 1904.

Receipts:

Balance from 1903 in the Savings Bank	$945 39	
In the National Bank	123 85	
Total,		$1,069 24
Received for annual dues for 1903	$14 00	
Received for annual dues for 1904	472 00	
Interest from the Savings Bank	38 18	
		$524 18
Making a total of		$1,593 42

The expenditures are as follows:

Publishing the Journal	$276 00	
Index to the Journal	56 10	
Printing	45 60	
Postage	44 95	
Clerical assistance, partly for 1904,	33 80	
Cigars	32 38	
Treasurer's bond	4 00	
Total		$492 83
Balance to 1905		$1,159 00

Respectfully submitted,

JAMES B. FIELD, Treasurer.

The Treasurer has sought to get this audited, but the auditor has been too busy. I move that this report be accepted when audited.

THE PRESIDENT: It is understood that when this report has been properly audited it will be accepted and placed on file. Dr. Durgin has a resolution which he is to read to the Association.

DR. DURGIN: I bring this resolution in consequence of a movement in the Metropolitan District of Boston and vicinity to suppress a smoke nuisance. It was thought that this Association would be an appropriate body to endorse this movement.

Resolved, That this Association of the Municipal Boards of Health of the Commonwealth of Massachusetts have noticed with satisfaction the measure brought before the legislature for the abatement of the smoke nuisance in the Metropolitan District of Boston and vicinity, and will gladly assist in any reasonable measure for relief from a nuisance and injury to health, everywhere recognized as such by all sanitary authorities.

(The resolution was adopted.)

THE PRESIDENT: It is a rather interesting fact, and I think a most encouraging fact, for this Association, that we have in successive years derived so much help from scientific men who are not physicians, and that medicine has at last, so far as public health questions go, called in all the resources of science, for they are all subsidiary to the great interests we have at heart. It is rather interesting, in noticing the title of Dr. Morse's paper, that the gentleman who is known in this community for his life-long friendship for the Japanese people should now be speaking to us on the subject of noise, when that particular people is creating more noise than any other collection of human beings on the face of the earth. (Applause.) Dr. Morse.

ABSTRACT OF PROF. MORSE'S PAPER ON "NOISE."

(Professor Morse was permitted, at his request, to publish his paper elsewhere, in advance of the date of issue of this journal. An abstract only is therefore given here.)

Professor Morse quoted a large number of experts concerning the injurious effect of noise, amongst whom were Dr. John H. Girdner, who says that "Noise plays an important part in producing neurasthenia"; The Journal of American Medicine, which condemns locomotive whistles as a menace to public comfort, health and sleep; the Philadelphia Medical Journal, which insists that American cities are pandemoniac under avoidable noises; Dr. Walter Kempsler, Health Commissioner of Milwaukee, who also strongly condemns locomotive whistling; the Philadelphia Medical News, Dr. Ernest J. Lederle, Dr. Walter B. Platt, and Dr. William Thomson, who severally condemn the prevailing city noises in the strongest terms.

Professor Morse then treats of the ordinary city noises.

First. As a nuisance: Political posters set up in Pompeii, 1,900 years ago, have been unearthed, showing that the principal platform of certain candidates was the suppression of street noises.

Second. As to attempts at amelioration, quoting the substitution in Belgium of soft-toned for screeching locomotive whistles, and referring to certain noiseless switching engines installed by the New York Central.

Third. As to depreciation of real estate by noises in the neighborhood, quoting various instances.

Fourth. As to the indictability of those responsible for noise, quoting recent decisions of the Superior Court of Massachusetts, allowing damages for noise caused by the Elevated Railroad.

Fifth. As to the necessity of certain noises, quoting relief obtained by protests to the Railroad Commissioners in cases of whistling for crossings, and other whistles, in Waltham, Belmont, Salem, Peabody, Franklin, Reading, Lowell, Southbridge, Malden, Medford, Woburn, Bradford, Concord, Melrose, Ware, Northampton, Arlington, Lawrence, Hyde Park, Brookline, the Newtons, and other places. He points out that if relief can and has been secured in these places, there is no reason why it should not be secured in all.

Sixth. Can the steam whistle be suppressed? Both locomotive and stationary engine whistling has been stopped in a number of cities—Cleveland, Atlanta, Newcastle, Pa., and in England. The address was extremely witty and eloquent, covering the ground thoroughly, in a manner impossible to reproduce in any way in a brief abstract.

THE PRESIDENT: The next paper is upon "The Effect of Noises Upon Weak and Nervous People," by Dr. Philip Coombs Knapp. I now have the pleasure of presenting Dr. Knapp.

THE EFFECT OF NOISE UPON WEAK AND NERVOUS PEOPLE.

BY PHILLIP COOMBS KNAPP, M. D., BOSTON.

At irregular intervals the sensational journalist, who has no degree of comparison but the superlative, and no knowledge of anything that has been said or done before yesterday's edition, informs us that the enormous increase of nervous diseases which

he assumes to exist is due wholly to the excessive amount of noise attendant upon the processes of modern city life. It is, perhaps, hardly necessary to consider his assertions seriously, or to attempt to refute them; but it is of course plainly evident that many of the noises of the city are unnecessary and could be dispensed with without other detriment than a slight expenditure of money. The gongs and horns of the trolley-cars, the fire department, the bicycles and the automobiles are necessary as a protection to the traveller, although their noise might be modified and lessened; the hucksters' cries, the clatter of steel rails in transportation, the toy pistol, the factory whistles, and the old nine o'clock bell are needless, and may well be eliminated, although to do so might mean a pecuniary loss to certain individuals.

The three great sensory conductive tracts, the visual, the auditory and the tactile, are in a state of constant stimulation during our waking hours throughout life. This constant stimulation is never attended with exhaustion, and is so much a necessity of life that consciousness would cease without it, motion would become impossible, and the centrifugal motor nervous apparatus, if deprived of its sensory stimuli, would atrophy. The sensory stimulus, whether through the eye, the ear or the skin, is a physiological, harmless, necessary process. If the stimulus become excessive, the sensory apparatus, especially in its peripheral receiving apparatus, may suffer. Deafness may result from constant excessive noise, producing affections of the inner ear and auditory nerve, as is common with boilermakers; and visual impairment may follow exposure to extreme degrees of light, as in snow blindness. In so far, then, as noise becomes excessive it may tend to impair the hearing of the healthy man; but this impairment of hearing by itself does not seem to lead to any other disturbance of the nervous system.

When we call to the aid of our ordinary sensory perception that higher faculty of attention or apperception, we introduce another factor which seems to be of some influence. The exact mechanism of attention is obscure, but it is ordinarily attended with certain motor muscular activities, the contraction of the

eye-brows, the compression of the lips, a certain stiffening of the muscles of the throat, a contraction of the aural muscles, and the like. As a result of these motor manifestations, or from some other cause, continued attention is sooner or later followed by fatigue, while the ordinary sensory perception without attention is attended by no fatigue whatever. The greater the attention, the sooner comes fatigue. Listening attentively, therefore, is often fatiguing; and with partly deaf people, who have to pay close attention to ordinary conversation to understand what is said, the effect may favor the development of a pathological fatigue or neurasthenia. In the same way, much greater attention is required to comprehend what we hear, if there is excessive noise. It is natural to expect, therefore, that fatigue would be more readily produced in those whose occupation requires intelligent listening under such conditions—the teacher, the stenographer, the student at his lectures, and the like. The noise increases the effort of attention and leads more readily to fatigue.

Finally, noise may have an influence in the healthy man in disturbing sleep. Sudden and unusual noises will inevitably wake the sleeper if they be loud enough, although some persons can accustom themselves to sleep in the noisiest surroundings. Many healthy persons, however, are light sleepers, and noise thus is often a serious detriment in diminishing the individual's ability to get the requisite amount of sleep.

Noise, therefore, may be harmful to the healthy person by increasing the liability to fatigue, by requiring increased attention and by diminishing the amount of sleep. In some cases, if excessive, it is further harmful by producing deafness.

When we come to deal with sick persons, the effect of noise is, of course, intensified. The typical "nervous" patient in the eyes of the laity is, of course, the neurasthenic, but many other persons of a neurotic type have many of the characteristics of the neurasthenic, even if they can not be classed strictly under that head. Furthermore, almost every sick person, whatever be his disease, is asthenic, and his nervous system usually shares

in that weakness, making him to a greater or less degree neurasthenic. All these persons are in a state of chronic pathological fatigue. The majority of neurasthenics and many of the neurotic class are poor sleepers. They are, furthermore, in a state in which fatigue is much more readily induced or increased than under normal conditions. They are also often hyperaesthetic in some or all of their sensory functions, so that a very slight stimulus may produce much more effect than in health. They resemble Hans Andersen's princess, who felt the pea under twenty mattresses and twenty feather beds. In these persons, therefore, from their increased excitability and their more easily induced fatigue, noise may be much more injurious than it is in health, and may intensify their disease.

There is another element in noise, beside its intensity, an element whose effect is much more variable and far less readily estimated, and that is its quality. It is held by many psychologists that every sensation is attended by an affective quality, pleasing or displeasing. Whether this be universal or not, it is certain that many noises have, primarily or secondarily, a displeasing quality, which varies with the individual or with certain conditions. The filing of a saw, for instance, is primarily disagreeable to the vast majority of persons. Hiawatha or the Good Old Summer Time becomes maddening after we have listened to it for several months, and the pop of the champagne cork arouses disgust only on the morning after. As we advance in education, sensitiveness and refinement, many sounds become unpleasant which are tolerated or enjoyed by the child or the savage, and thus constitute a source of annoyance.

We have seen that ordinary sensory perception is a normal physiological process, which goes on continuously, without nerve exhaustion. If this perception be attended with emotional conditions, involving pleasure or pain, exhaustion is sooner or later produced, according to the intensity of the emotion; just as exhaustion follows the process of attention. To the healthy man the unpleasantness of the wheezy hand organ, the concert of cats on the back fence, or the squawk of the "devil's fidde" that

swept this region like an epidemic in the early seventies, is an annoyance which hardly rises to the dignity of an emotion, yet which may facilitate fatigue. To the hypersensitive neurasthenic and neurotic, and to all hypersensitive invalids, such annoyances may become so great as to be positively disturbing and intensify all their troubles.

Noises of too great intensity, therefore, may be injurious to health by interference with sleep and by facilitating the onset of fatigue; noises of unpleasant quality may be irritating and annoying and thus render life more unpleasant and increase fatigue. The civilized community will restrict not only everything which impairs the health, but everything which is disagreeable to a considerable number of its members. We have not yet attained that standard of true civilization.

THE PRESIDENT: The next paper is upon "Some Considerations Concerning City Noises," by Prof. James J. Putnam.

"SOME CONSIDERATIONS CONCERNING CITY NOISES."

BY PROF. JAMES J. PUTNAM, BOSTON.

In studying the problem of noise with such data as my experience and general information has furnished, I have been forcibly struck at finding two classes of facts which seem to stand in contrast with each other. Thus, we find, on the one hand, persons who suffer acutely from noises, especially noises of certain sorts, and many whose sensitiveness thereto seems to increase rather than diminish as time goes on; while, on the other hand, there are persons also who seem to get not only relatively but absolutely habituated to noise, or, to speak perhaps more correctly, whose power of concentration makes them oblivious to the disturbances of every sort by which they may be surrounded.

As an example of the first class of persons, I would mention the case of a lady of great intelligence, although also

a great invalid, and in some respects of highly nervous temperament, who for many years was such a sufferer from noises that she sent out and had all the crickets killed upon her country place, and would gladly have induced the authorities to remove a distant siren, stationed as a warning to vessels on a dangerous shore, if the public safety had permitted.

No one unfamiliar with the sensitiveness of nervous patients can easily conceive how much greater are their sufferings in these respects than the sufferings of persons in ordinary health.

As an example of the second class, I will refer, as a counterpart to the celebrated instance of Archimedes, who continued to work out his geometrical problems on the sand, oblivious to the assault and taking of the city—to the case of a personal acquaintance, who can write and study in his library in positive ignorance whether his daughter has been playing the piano in the meantime or not, and who, in general, so loves the city sounds that, on returning after an absence, he declared he wished for nothing so much as for a chance to stand in Dewey Square and hear the rattle of the express carts and the thunder of the passing trains.

If all our citizens belonged to this latter class of persons, the problem before us today would cease to be of practical interest. This is, however, far from being the case, and the questions which especially interest me in this discussion are the following:

1. How far can habituation practically be counted on as a means of relieving the distress suffered by most persons,—the average person, we might say,—from the distressing and injurious effects of noise?

2. Is this process of habituation, when it occurs, apt to be attended with unfavorable results?

3. What are the conditions which especially interfere with a favorable habituation, and which ought, so far as practicable, to be eliminated?

1. As regards the extent to which habituation ordinarily goes, I believe, in the first place, that the experience of most of

us here, who have, presumably, fair health, and are engaged in more or less literary pursuits, is not equivalent to that of the gentleman above cited. Most of us cannot read and study, or do the sort of work as falls to the share of accountants in city offices or clerks in city stores, who have to cast up accounts and consider the problems of possible customers, with the same comfort and precision as in the midst of quiet. Lawyers and business men seek elevated and distant rooms for their offices, where they can talk, think and labor undisturbed. An architect friend keeps his office window closed, even in summer, on account of the difficulty of working in the midst of the street noises. It is true that the operatives in mills and the drivers of express teams and dray-carts acquire, in many cases, a considerable immunity, so that, for example, the tenders of looms, who spend their days amid the deafening roar of the cotton mill, are said to be able to converse with each other without special labor. But it must be remembered, first, that the work that they perform does not, as a rule, require much flight of thought, or consideration of new problems, and, next, that the noise to which they are subjected is uniform and continuous, which, as I shall try to show, is a consideration of importance. Last, but not least, no one has sufficiently estimated the sufferings which they actually endure. With weak and nervous persons, such as Dr. Knapp has been considering, habituation often fails to occur at all, and the strain of noise and tumult, up to a certain point, at least, is one of progressive increase.

Habituation may, then, be counted on as perhaps thoroughly effective with persons of strong nerves and unusual powers of concentration, and under conditions which are especially favorable; it is only moderately effective with persons of ordinary health and living the ordinary lives of the hard-working citizen; with delicate persons, and especially with the large class of more or less fatigued persons, who, for one or another cause, have a nervous dread of noise, habituation is not effective at all.

2. As regards the question whether attempts at habitua-

tion are liable to be attended with unfavorable results, I have a strong impression, almost amounting to a belief, that the grade of work which is done under the influence of city noise is usually inferior to that done under relative quiet, and that the standard of the work which might be done becomes gradually lower. It is true that most persons can work satisfactorily, and often to even better advantage, while listening, though without particular attention, to continuous and pleasant sounds, such as those of music, or even of the distant hum of city sounds, when heard, for example, from the distance of a pleasant office on an upper floor of a tall building. Under such conditions these external sounds may be just enough to gather up the wandering rills of thought, which, in the midst of an absolute quietness, such as that of the country hillside, might intervene to disconcert the main current of attention. But this is far different from doing good mental labor under the distracting conditions of tumult which beset many of the workers in our large cities. If this opinion is correct, a corollary of practical importance must, I think, also be admitted, namely, if the work done under these conditions is less good the nervous strain of attempting it must be more severe, and more likely to be attended with injurious effects upon the health. For both of these reasons, a reasonable degree of quiet ought, so far as practicable, to be secured for all persons of whom good work, implying concentration, attention and interest, is to be required.

3. As regards the question what the conditions are which make a satisfactory habituation more difficult, I would offer the following considerations: (a) Intermittent noises are far harder to bear than continuous noises. A gentleman of my acquaintance, who found himself obliged to spend some nights on Boylston street, near the crossing of the Albany railroad, and with electric cars frequently passing, actually set up an electric fan in his room so that he might bring the habituation to a continuous noise to his aid in learning to sleep through the intermittent noises. It takes a long time to become so accustomed to the crash of occasionally passing trains to such an extent

that they do not seriously inerrupt the flow of passing thought. An inhabitant of a country town, into the main street of which, hitherto the abode of absolute stillness, electric cars had recently been introduced, declared that they seemed to him to be tearing up the very roots of the trees in passing. Even persons who live in the neighborhood of loud chimes, although good in themselves and well-played, like those of the Church of the Advent, are very much annoyed by them, whereas the inhabitants of foreign towns, where the great cathedral bell is almost in constant service, are supposed, at least, not to be disturbed by the sound. One reason which has been adduced by certain persons for objecting to chimes is that they are doleful and call to mind distressing thoughts, as of sadness and funerals. Perhaps with the great majority of persons this consideration is unimportant, but I will use it for the sake of calling attention to another point of practical significance, namely, that we endure better the sounds which suggest enterprises with which we are in sympathy than we do those suggesting enterprises to which we are indifferent or adverse, It is partly for this reason that the ardent lovers of civilization, especially of civic life, more easily endure the racket of the town, and that those who love to see demonstrations of cheerfulness and activity like the street bands and hurdy-gurdys, even when the instruments are out of tune. We endure, as a rule, the noises made by our own children better than those made by our neighbors', until, through philosophic reflection, we regard our neighbors' children as our own. I have frequently attempted to make use of this principle in training sensitive persons to a greater disregard to the noises by which they were surrounded, and I believe that this attempt should be made more frequently than it is. Thus, I have recently had the care of a nervous patient, lying in a room at the Massachusetts General Hospital opening on a ward corridor, which was free from many of the hospital noises, but where a number of children were playing about and perhaps occasionally indulging in tears. In the next room lay another patient, coughing from acute bronchitis. The patient

of whom I speak began by suffering acutely and increasingly from these disturbances, which prevented sleep and kept her nerves on edge. I told her she must get over them by imagining the children as her own and the coughing patient as a member of her family, or, at any rate, by thinking of herself as playing with them and entering into the spirit of their game, or as occupying the position of a nurse. Fortunately, the suggestion proved acceptable, and very soon the patient herself admitted that she had become indifferent to the disturbance.

Again, it is much harder to become accustomed to noises associated in the mind with ideas or memories of an unpleasant and, especially, a terrifying sort, and this is, I believe, one reason why the whistles, the bells and the earth-shaking of approaching trains is with difficulty endured, especially at night.

The harsh and often thoughtlessly sounded gong of the bicycle is another case in point, and I would gladly see this nuisance abolished and the burden of avoiding a collision thrown wholly upon the rider.

All persons, then, whose work requires attention, concentration and judgment should be secured a chance to work, so far as practicable, without being forced to habituate themselves to loud noises, near noises or intermittent noises; the fact should be borne in mind that a considerable proportion of city workers are under more or less fatigue and strain and are therefore apt to be sensitive to noise, and that with this sensitiveness there often goes a higher standard of mental and emotional efficiency.

As regards the matter of habituation, and the question whether insidious harm is not liable to attend the process, I would call attention to the analogous case of the habituation to the effects of impure air. It has, namely, been well proved, both by experiment and observation, that persons who have been exposed continuously for some time to bad air feel the effects thereof apparently less than persons who are suddenly introduced into it from a pure atmosphere. Yet no one, I pre-

sume, doubts that in the first case as well as in the second injurious effects occur.

It has passed too long for sound doctrine that the senseless clangor of July 4th, the needless shrieking of the locomotive and the fatiguing racket of the streets are nuisances which the good citizen should endure in silence.

THE PRESIDENT: These very interesting papers, upon this most important subject, are before you, gentlemen, for discussion. Prof. Sedgwick, we would like to hear what you have to say about this matter.

PROF. W. T. SEDGWICK: Mr. President and fellow members, I am exceedingly glad that Prof. Morse has come in here and given us his ideas on a subject which he has studied for a long time and about which he has felt very deeply. He has kept watch of this thing for a number of years, and yet, to show how different the opinions of excellent people are in matters of this line, I may say that on one occasion, in talking with Dr. Henry Bowditch about the cleaning up of our streets, he took a very optimistic view and had said: "Well, I suppose that pretty soon the cities will become the nicest places in the world to live in; we shall have better water than in the country; we shall have better food protection; we shall not be wetting our feet; the cities will be ideal places to live in." I had assented more or less, and went on to my office. In opening my mail I found one of Prof. Morse's papers which was entitled, "Can City Life be Made Endurable?"

Nothing is more striking in these days than that city people are generally fatigued. They are fatigued all the time. "That tired feeling" which is referred to in quack advertisements is found not only in the country but in the city. When vacation time comes and the city man goes into the country, he sometimes cannot sleep because of the lack of noise. This may show that he has been habituated to the noise, but it seems to me that it shows a good deal more, namely, that he is in a very abnormal pathological condition, from any high standpoint, and I

believe that one of the great problems of cities is to control noises in order to make the cities more habitable. You and I can stand these noises as we say,—or, at least, we do stand them, although we prefer not to. A man can say that he can live amid clanging bells and shrieking whistles and be happy at the same time, and so he can if he is strong and well; but there are many delicate people who are just as much entitled to the rights of life and liberty and happiness as we are who are strong, and it is our duty as health officers to have a thought for those people and their welfare. If they happen to be our own friends on beds of sickness, we realize what it all means.

THE PRESIDENT: Dr. Durgin is certainly responsible for more things in this Commonwealth than anybody else (laughter), and I think we had better hear what he has to say about this subject.

DR. DURGIN: If it were true, as said by our worthy Chairman, that I am so responsible, all the worse for me. I feel vastly interested in this subject of unnecessary noise, and have taken great pleasure in listening to these valuable papers and in witnessing the interest manifested all through the audience. It makes me feel as if there may be a better day coming. For many years I have regarded noise, smoke and dust as among the great evils and public nuisances in city life, and certainly so in Boston. My sympathies have always been with those who were suffering from unnecessary noise. There was one case in particular, about twenty years ago. We tried to find a remedy for an infernal noise coming from a circular saw seriously affecting a sick person across the street, who could not escape the injury and discomfort from this noise without breaking up a valuable home. Before we realized our inability to do anything, we had more than half promised relief, but when we reached the law department of the city we were turned down, as having no jurisdiction over noise. The husband of the sufferer was then advised to take the case to court on his own motion. He did so, and lost the case. It

seems to me that this is a serious condition, and we ought to find or secure an adequate law; and I hope that every member of this association will constitute himself a committee of one whose energies shall be directed and forcibly exercised upon this question.

There are many more sources of unnecessary noise than have been mentioned here today. The "din of the streets" is proverbial. Of course, a very large part of the noise in the streets is due to the rough pavement, and much is due to clattering tailboards, and sideboards of ice wagons and tip-carts, and to unsecurely loaded drays. Much of the street traffic is accompanied by unavoidable noise which can be borne without complaint, but I am satisfied that much of the noise is needless and can be avoided.

I feel intensely interested to learn who is responsible for stopping this noise. I hope that it is the State Board of Health. (Laughter.) But I am fearful that it is not there. I have strong evidence that the authority does not reside in my board, but if it does I will promise you every effort that it is in our power to exercise. I hope this Association will find out who is responsible, charge him with it and make him do his duty. (Applause.)

THE PRESIDENT: Prof. Morse has more decided ideas upon this subject of responsibility perhaps than anybody else, and very likely he can answer that question for us.

PROF. MORSE: Some years ago in the city of New York a law was passed compelling those who carried through the streets loads of iron bars to wrap them in jute. A driver, the next day after these notices had been posted warning all drivers not to carry loads of iron bars without being muffled, ignored the law and started up Broadway with one of those rattling teams of iron, and he was immediately fined $25. That stopped that noise in New York forever.

I remember the first night I spent in Berlin. I went to the hotel and was awakened at an abnormal hour by hearing the

tramping of a great many horses. It sounded as if a troop of cavalry was going by. I jumped up and went to the window and looked out, and I found that it was simply the ordinary traffic of the street. The pavements were so smooth that I heard no noise from the teams, but only the sound of the horses' feet. In all the large cities in Europe you do not notice the noise of the street. Then, the streets are kept so clean. Now, if one city can keep clean and quiet, every other city can do likewise.

Dr. Durgin has spoken of the noise of a saw mill. In England the law compels objectionable noises from factories to cease on the complaint of any one who is annoyed by them. I know where they have stopped a trip-hammer and also a saw mill in the neighborhood of a family residence. That is, the rights of the citizen are respected.

What I would especially urge is that the State Board of Health should go into serious consultation with the Railroad Commissioners and insist that if the steam whistle can be stopped in thirty towns of this state, it can be stopped in all of them, even if it is necessary to modify the laws of the Commonwealth. (Applause.)

DR. AGNES C. VIETOR: I find that no one has spoken this afternoon of the unnecessary noises made in the starting of trains. A petition has been circulated in the Hotel Oxford, in the Hotel Somerset and in the apartment houses which are along both the New York & New Haven and the Boston & Albany roads, as far as they are in Boston, complaining of this thing, but I am not able to find that that petition is likely to be beneficial. I am told that it is only one of a line of petitions which have been ineffectual. It is not only the starting of the trains in the immediate neighborhood of the house, but there is the puffing of the engine which, as you probably know, continues for quite a distance from the station. I have talked with several gentlemen who have a knowledge of railroad matters, and they tell me that the causes are two: First, there is some attachment which can be applied to the locomotive which will lessen this

noise, but it is not applied to the engines because it is expensive and the railroads will not apply this attachment until they are compelled to, on account of the expense. Then the second cause of the trouble lies with the engineer; he can so control the starting of the engine as to largely control the noise and diminish it. The noisy starting of the train is said to be destructive to the locomotive itself. Then, if this noise is controllable, if the engineers can be taught to diminish this noise, and if the diminishing of the noise by this proper starting of the train will save the company expense, why isn't it done?

DR. DURGIN: I want to say that we are looking for an invitation for the April meeting from some one outside of Boston. I would like to move the thanks of the Association to Prof. Morse, Dr. Knapp and Prof. Putnam for their excellent and instructive papers on the subject of unnecessary noise. (It was so voted.)

PROF. SEDGWICK: Mr. President, the Nominating Committee desires to submit the following nominations: For President, Dr. Walcott; for first vice-president, Dr. Durgin; for second vice-president, Dr. Chapin of Providence; for secretary, Mr. James C. Coffey; for treasurer, Dr. James B. Field, and for Executive Committee for two years, Doctors Emerson of Springfield, Woodward of Fitchburg, Kennedy of Lawrence, Everett of Hyde Park, and Kyte of Milton.

THE PRESIDENT: Gentlemen, you have heard the list of names reported by your committee. What is your pleasure with regard to them?

PROF. SEDGWICK: I move that they be elected.

THE PRESIDENT: It is moved that the gentlemen recommended in the report of your committee be elected as officers of your Association. If that be your pleasure, you will signify it by saying aye.

(Response, "Aye.")

THE PRESIDENT: Contrary minded, no. (No response.) They are duly elected.

Some discussion of certain phases of the internal economy of the Associaton followed, without action being taken, and the meeting then adjourned.

PREVENTIVE THERAPEUTICS.

BY HERBERT D. PEASE, M.D.,
Director of the Antitoxin Laboratory, New York State Department of Health, Albany, N. Y.

ANTISTREPTOCOCCIC SERA.—Besredka (Bulletin de L'Institut Pasteur, Tome II., Nos. 16 and 17, 1904) in a critical review entitled "Does There Exist One or Several Streptococci?" states that largely upon the answer to that question hangs all anti-streptococcic serum therapy.

That the possible unity or diversity of species of streptococci has played a large role in the attempted explanations of any favorable action of the various antistreptococcic sera submitted to experimental or clinical tests, is undoubtedly true. However, a definite answer to the question propounded by Besredka would undoubtedly not settle all the clearly evident problems concerning the serum therapy of streptococcus infections.

Besredka considers the important works and studies upon the morphological characteristics of streptococci, and concludes that all attempts at classification on these differences known at present rest on a most insecure foundation.

He considers in more or less detail a number of biological characteristics, and on the basis of our present knowledge successively eliminates them as satisfactory foundations for the determination of the question he raises in the title of his article. Such characteristics included the sign of Marmorek, or the inability of streptococci of one group to develop in the filtrate of other cultures of the same group, the ability to produce a haemolytic agent, the agglutination reaction, and the preventive power and his so-called "fixation" property of antistreptococcic sera. He is inclined to believe that the use of the tests for

the last named characteristic may be ultimately successful in separating groups of streptococci.

If Besredka's conclusions are correct, and they are substantiated by others, we have left, therefore, as a means of judging the therapeutic value of antistreptococcic sera for the present, at least, only the results obtained from their use in infections by these micro-organisms in man. However, the conditions under which such clinical results are obtained are so variable, and infections are so polymorphic in character, that the deductions from such observations on anything but the most extensive scale are apt to be misleading.

Recently the interest in the subject has centered chiefly on the results obtained by the use of antistreptococcic serum in those specific diseases, scarlet fever, rheumatism and smallpox, in which streptococci have been shown to be present in unusual numbers, and are considered to be either their etiological agent or the cause of secondary infections.

SCARLET FEVER.—Baginsky (Berliner Klinische Wochenschrift, 1902, Nos. 48 and 49,) believing that streptococci had an etiological relationship to scarlet fever, used Aronson's antistreptococcic serum in the Kaiser u. Kaiserin Friedrich Kinderkrankenhaus in Berlin on 63 cases of scarlet fever in doses up to 20 c. c. each. Of these, nine died, generally from sepsis, giving a fatality of 14.3 per cent. The death rate in this hospital from scarlet fever in ten years had varied from 34 per cent. to 12 per cent. The cases on which he tested the serum were severe in his opinion, and he believes the injections of the serum did much good. Their effect on the clinical symptoms was in his opinion quite marked. A closer analysis of the figures demonstrates the death rate in the injected cases to be 11 per cent. and in the uninjected 17 per cent.

Aronson's serum, such as was used by Baginsky, is prepared by the injection of horses with cultures of streptococci rendered virulent for small animals.

Moser (Wiener Klinische Wochenschrift, 1902, No. 41, also

Wiener Klinische Wochenschrift, 1903, No. 44), believing that Aronson's method of preparing antistreptococcic serum impaired its protective effect against streptococci virulent to man, used for the treatment of scarlet fever cases a serum prepared by Paltauf, by the injection of horses with numerous cultures freshly obtained from fatal cases of that disease.

Escherich (Wiener Klinische Wochenschrift, 1903, No. 23) used this serum extensively and followed Moser in using large doses.

In all he reported 142 cases treated with Moser's serum in doses varying up to 180 c. c. The effect on the clinical symptoms, he states, comes on rapidly within four to twelve hours. It consists in the relief of all the symptoms without shock or collapse. The temperature falls, also the frequency of the pulse and respiration, and the nervous symptoms subside. The serum must be given early before, or not later than, the height of the temperature and specific symptoms which usually follow the acute poisoning. The same holds true of the effect of the serum injections on the sequalae, such as otitis media, endocarditis, nephritis, etc. These are not prevented nor influenced if the serum is not given very early in the disease.

Escherich gives figures showing a diminished death rate in the St. Anna-Kinderspital of from over 12 per cent. before the introduction to 9 and 6 per cent. after the introduction of the Moser serum.

He believes the serum acts as a true antitoxic agent on account of the rapidity of its effect on the toxic symptoms. A few control tests with normal and another antistreptococcic serum have been repored, but they did not show the same strikingly favorable results.

V. Bokay (Deutsche Medicinische Wochenschrift, 1904, No. 1, p. 6) also reports the results of the use of the Moser serum in 12 cases. Single doses between 100 and 200 cubic centimetres were used, and in but two cases was it necessary to repeat the first dose.

The author obtained practically the same results as did Escherich.

RHEUMATISM.—In the treatment of articular rheumatism Menzer (Muncher Medicinische Wochenschrift, 1904, No. 33, 1461), uses an antristreptococcic serum prepared, as is the Tavel serum, by the treatment of horses with a number of cultures obtained directly from man, and not artificially enhanced in virulence.

He believes that the serum acts, not as an antitoxin, but by the stimulation of the phagocytic cells of the infected person. He claims that a healing reactive hyperaemia occurs after the injection of the serum, and that this reaction is indicative of, and necessary for, the best results. The beneficial effects which he expects from the injections are the prevention of subsequent acute attacks or the avoidance of the persistence of a chronic form of the disease, and also the prevention of heart complication.

Small doses of five cubic centimetres each were administered to 47 acute cases. Of these 45 recovered, 25 had remained well for one year, one had a recurrence and 21 were lost sight of after recovery.

Of 11 secondarily chronic cases, eight were quickly relieved and the others were benefited. Nine remained well and two were lost sight of.

Of 11 primarily chronic cases, five recovered, two were much improved and four were only partially benefited.

Schmidt (Berliner klinische Wochenschrift, 1903, No. 49, s. 1117,) used the Menzer serum in 15 cases. Of these, six were benefited, four obtained doubtful relief and five were not relieved. The author closely agrees with Menzer as to the mode of action of the serum. It is not antitoxic in its action. He obtained the best results in subacute cases of rheumatism, but little effect in the acute, and none in the chronic.

SMALLPOX.—In view of the claims of Moser concerning the use of antistreptococcic serum in scarlet fever, Perkins and Pay (The Journal of Medical Research, 1903, Vol. X, No. 2,) administered such a serum in nine cases of smallpox. In this disease the authors had found streptococci present in the circu-

lating blood in 54 per cent. of the cases examined, and in the heart's blood of practically all the cases examined at autopsy.

Of the nine cases treated with the serum, in none could any benefit be detected. Where streptococci were in the circulating blood the serum treatment did not diminish their number.

In order to make up any possible deficiency in the so-called complement in the patients' sera, and thus enable the immune bodies in the antistreptococcic serum to bring the complement into union with the infecting organisms, according to Ehrlich's theory of bacteriolytic action, normal serum from a healthy person was administered to three cases who also received the antistreptococcic serum. No benefit was noted from this treatment.

ENDOCARDITIS.—Horder (Lancet 1904, Volume II, No. 3, p. 143,) reports a unique case of chronic streptococcus endocarditis, in which the infecting microorganisms were isolated from the circulating blood of the patient and were utilized in the the immunization of a donkey whose serum was used in the treatment of the case.

Preceding the injection of the serum of the well immunized donkey, the patient was injected with 30 cubic centimetres of serum from a normal person, with the idea of making up for any deficiency of complement in her own serum. Also just before the use of the immune serum, normal donkey serum was administered as a control test. No beneficial change in the clinical symptoms of the patient was noticed from the use of these sera.

A horse was also immunized with the streptococcus isolated from the patient's blood, but the administration of this serum did not produce any beneficial change in the patient.

The author concludes that the case was either one of mixed infection or that the immune body was deficient in the specially prepared anti-streptococcic sera, or that the patient's serum did not contain sufficient complement to bring about bacteriolysis of the infecting streptococci. He believes that neither of the two latter deficiencies existed.

VETERINARY SANITATION.

VERANUS M. MOORE, B. S, M. D.,
Professor of Comparative Pathology, Cornell University, Ithaca, N. Y.

VACCINATION AGAINST TUBERCULOSIS IN CATTLE.—The very general distribution of literature throughout the dairy districts of the Eastern United States, announcing von Behring's method of immunizing young cattle against tuberculosis, is a matter worthy of very thoughtful consideration. The company which is announcing this discovery is also advocating its use in a practical way. The apparent successes attained are considered sufficient to warrant the most exaggerated statements concerning the efficiency of the method. So attractive are the statements that it will be surprising if many cattle owners are not induced to try the experiment without making further inquiry into its merit.

Von Behring has for a number of years been studying the effect of human tubercle bacilli upon cattle. His aim seems to have been to heighten the resistance of the inoculated animals to natural infection with tubercle bacilli from cattle. As his work continued, he hoped to immunize the treated animals to the disease. Although the results obtained lead the author to believe his theory of immunization of cattle against this disease will prove to be correct, they have not extended over a sufficient length of time to warrant the bold assertions of the American company that is trying to use the results in a purely commercial way. Before this can be justified, the following facts should be determined, namely: If immunity is established in cattle by the inoculation with the attenuated human tubercle bacilli, is such immunity permanent?

INFECTIOUSNESS OF THE MILK OF TUBERCULOUS COWS.—The question whether or not the milk of tuberculous cows is dangerous may be answered, in so far as the presence of tubercle bacilli are concerned, by a summary of the results of the various investigations into this subject that have been reported. Of the many investigations that have been made

to determine the proportion of tuberculous cows which yield infectious milk, the average results are about 15 per cent., while the cases of tuberculosis of the udder are about 2 per cent. A further evidence of the frequency with which tubercle bacilli are present in the milk of tuberculous cows is found in the large number of calves and pigs that are found tuberculous among those fed with the milk of diseased cows. Last year the Federal meat inspection service condemned for tuberculosis about 20,000 hogs. An inquiry into the source of these animals shows that they come largely, if not entirely, from the dairy districts. During the last year the writer has had occasion to inspect the temperatures taken in the tuberculin test of a considerable number of young cattle, that, as calves, were fed milk from reacting cows. Of those under six months of age, over 80 per cent. gave the tuberculin reaction.

The fact seems to be clearly established that one of the serious means of transmitting tuberculosis to young animals is through the milk of tuberculous cows. This suggests the desirability of sterilizing all milk, not known to come from healthy cows, before it is fed to such animals. If we are to eliminate tuberculosis from our dairies, one of the very important things for every cattle owner to do is to protect the uninfected, especially the young.

NODULAR DISEASE OF THE INTESTINES OF SHEEP.—There is perhaps no affection so often mistaken for tuberculosis as the nodules on the intestines of sheep, caused, as pointed out by Curtice, by an invasion of the *Oesophagostoma Columbiana*. Not infrequently sheep are destroyed because of this parasitism, and often the carcasses of sheep slaughtered for food are rejected because of the presence of these nodules. The fact is, this parasite is quite widely distributed, and its appearance may be expected in almost any flock of sheep.

Recently, Dalrymple, of the Louisiana experiment station, has been conducting a series of experiments for the purpose of deterring the method of infestation of sheep with this worm, and also methods for its eradication from pastures. He found that

infested sheep may distribute the worms on clean pastures and thus transmit them to healthy sheep which may subsequently graze upon the same fields. It was found that after the infested pastures had been plowed and cultivated for a single season, lambs may safely be allowed to graze upon them when subsequently they become pasture land. The offspring of infested ewes may be raised free of the parasite if the proper precautions are taken. It is suggested in the report that old infested pastures may be freed of the parasite by cultivation. This, however, will not meet the difficulty in many localities where sheep graze on land that can not be cultivated.

MUNICIPAL SANITATION.

CHARLES V. CHAPIN, M. D.,
Superintendent of Health, Providence, R. I.

FORMALDEHYDE DISINFECTION.—The State Board of Health of Maine,* in a recent circular, recommends a simple method of disinfection with formaldehyde. It is perhaps not intended that it should supplant all other methods, but it ought to prove convenient in country districts or in all places where it is difficult to obtain or transport the more common forms of apparatus. The principle employed is the liberation of the gas from formalin by the action of permanganate of potassium. The directions are to use a flaring ten-quart tin pail, which perhaps had best stand in a dish pan. The room should be made ready and 6 1-2 oz. of the permanganate for each pint of formalin should first be placed in the pail. Two pints of formalin should be used for every 1,000 cub. ft. of space. When everything is ready the formalin should be quickly poured upon the permanganate and the operator should hurriedly leave the room. A good deal of foaming takes place, so that if more than three pints of formalin are used, a larger pail, or two pails are necessary. The success of the process depends upon the fact that practically the whole of the formaldehyde is liberated in a few minutes, and that the

*State Board of Health of Maine Circular No. 75.

heat of the reaction generates sufficient steam to ensure efficient disinfection. The permanganate in 10 lb. lots is said to cost 15c. a pound. This process was tested both in winter and summer in various apartments, mostly in cheap tenement houses, and with the following results. Of 1,529 test objects exposed only 27 showed a growth after incubation for at least 48 hours. Of these 27 unsuccessful results, 21 were with the exceedingly resistant hay bacillus (B. subtilis). None of the bacilli of diphtheria, typhoid fever, or other ordinary pathogenic germs, survived the exposure to formaldehyde.

A NEW DOMESTIC FILTER.—Mr. James G. Woolworth of Providence, in a paper read before The American Chemical Society, described a new domestic water filter invented by himself. The mechanical basis of the filter is the ordinary Pasteur filter, though a tube of coarse pottery like that used for flower pots may be used instead of the ordinary porcelain. The essential part of the filter, as designed by Mr. Woolworth, consists of a layer of a mixture of mineral wool and freshly precipitated aluminum hydroxide applied to the pottery cylinder. The most remarkable thing about the filter is that the addition of this layer of fine filtering material increases instead of diminishing the flow of water. Thus, twenty-five minutes after starting, the delivery was seven times that of the naked tube, and at the end of fourteen days it was twice as great as that of the naked tube. Several specimens of this filter have been tested bacteriologically by Prof. F. P. Gorham, of Brown University, and chemically by Mr. Ernest F. Badger, Chemist of the Rhode Island State Board of Health. Prof. Gorham* states that a filter examined by him at frequent intervals for over a year invariably furnished sterile water. Other specimens of the same filter also furnished sterile water at every test. The filter needs cleaning much less often than the plain porcelain filter. According to Mr. Badger, the filter removes 95.9 per cent. of the color, 83.3 per cent. of the albuminoid ammonia in solution, and 100 per cent. of the albuminoid ammonia in suspension and 100 per cent. of the turbidity.

* Remarks at a meeting of the American Society of Bacteriologists, Philadelphia, 1904.

THE EFFICACY OF HOUSE DISINFECTION.—House disinfection is done by most health officers without any inquiry as to its necessity or efficiency. The Baltimore Health Department* has attempted to show the efficiency of its disinfection. In a former report† it is stated that test cultures are placed in each house which is disinfected, and that that year of 1,242 of these cultures examined, 18 per cent. were found to have resisted the disinfectant. This would indicate that so far as the test organisms were concerned, the disinfection was successful in 82 per cent. of the houses. In the 1903 report it is shown that after 957 disinfections for scarlet fever the disease recurred 18 times, or in 1.8 per cent. of the cases, and after 1,168 disinfections for diphtheria it recurred 34 times, or in 2.9 per cent. of the cases. In 42 of the 52 recurrences the disinfection was tested by the exposure of bacterial tests in the room. According to these tests, the disinfection was successful in 83.4 of the cases. The report infers that the disinfection was successful because there were so few recurrences, assuming that the recurrences would have been much more numerous if there had been no disinfection, and claiming that some of the recurrences should be explained as due to failure of disinfection. While any attempt to investigate this subject is refreshing and praiseworthy, the inferences and assumptions do not seem to be warranted by the facts. There seem to be no data available anywhere to show the necessity for disinfection. It is just as reasonable, and in the writer's opinion a great deal more reasonable, to assume that these recurrences of the disease after disinfection are due to reinfection from some person in the house, rather than from the house or its material contents. That it is infected persons, not infected things, that cause recurrence of scarlet fever and diphtheria, seems to be borne out by the fact that such recurrences are just as common after the return of patients from the hospital as they are after the termination of isolation at home. The writer is not aware that any of the large hospitals in this coun-

* Annual Report of the Health Department of the City of Baltimore, 1903, page 122.
† Annual Report of the Health Department of the City of Baltimore, 1902, page 145.

try, as in New York, Boston and Philadelphia, have taken pains to publish their statistics relating to "return cases," but English statistics on this point are available. Thus in London* (*Metropolitan Asylums Board, Return Cases of Scarlet Fever and Diphtheria, Special Report 1901) in 1898-9, scarlet fever recurred in statistics on this point are available. Thus in London* in 1898-9, scarlet fever recurred in 2.9 per cent. of the houses to which patients returned after recovery and discharge from the hospital, and the recurrences in diphtheria were 1.9 per cent. Of course, both in Baltimore and London, it is probable that some of the recurrences were mere coincidences, but it is certain that the real recurrences after return from the hospital must be due to infection by the person of the convalescent. As recurrence after termination of isolation in the home is not more numerous, is it not likely to arise from the same source and not from infected things?

SINGLE SERVICE PAPER MILK BOTTLES† — Paper milk bottles have recently been placed upon the market, and Dr. A. H. Stewart, of the Bacteriological Department, Philadelphia Bureau of Health, has tested their efficiency. The bottles are very strong and do not leak. They are made waterproof and sterlized at the same time, by dipping in a bath of hot paraffin. He found that the bottles were sterile, and that the milk shipped in them contained about one-fourth as many bacteria as that shipped in glass bottles. They cost about a cent apiece.

VITAL STATISTICS.

JOHN S. FULTON, M. D.,
Secretary Maryland State Board of Health.

THE VITAL STATISTICS FOR INDIANA in 1903 are published in the twenty-second annual report of the State Board of Health. The registration law of Indiana has one unique penalty. In case a body is buried before the death record has

* Met. Asylums Board, Return Cases of Scarlet Fever and Diphtheria, Special Report, 1901.
† *Medical News*, January 28, 1905.

been made, the body may be exhumed. The Indiana law appears to secure good numerical results. The death rate for 1903 is 13.46 per 1,000. This rate is consistent with the reported experience of that part of the country, though the figures are not quite convincing. The results promise very well for the early admission of Indiana to the group of registration States. The report for 1903 is the fourth annual report on vital statistics. The mortality is tabulated by ages, by locality, by months, by sex, by nationality and by conjugal condition. The distribution of the population by ages is not stated. One wonders whether an age distribution of population could be satisfactorily determined for Indiana. It is said that among those who were blessed with children during 1903 there were 35 mothers above the age of 60 years. The registration of births in Indiana is very unsatisfactory, as is the case almost throughout the United States.

Mr. Adams, in the article mentioned above, calls attention to one of the weaknesses of medical death certification. A "prominent Cincinnati physician" admitted to Mr. Adams that he never certified deaths from tuberculosis. Such deaths in his practice are certified as due to bronchitis. It is said that in France this prevarication is very common, insomuch that the bronchitis account is generally understood to include the consumption mortality.

In this country a considerable part of the consumption mortality is hidden in the accounts of bronchitis and pneumonia. It seems likely that this particular falsification has increased with the growth of industrial insurance. Mr. Frederick Hoffman does not think that falsification of death certificates plays any part in the apparent decline of tuberculosis or in the apparent rise of pneumonia. The great industrial companies, such as Prudential and Metropolitan, he says, do not void their contracts in case of early death from tuberculosis. Moreover, the falsification of a death return is a grave violation of law. Nevertheless I believe that deaths from tuberculosis are very often deliberately certified as due to bronchitis or to pneumonia.

The death certificates of a Baltimore physician, having a large practice among wage-earners, were found to include so many

deaths from bronchitis that he was sent for and confronted with his certificates. He admitted that some of these patients were consumptives, but pleaded in extenuation that nearly all of his patients were insured, most of them in small concerns, and that certificates of death from tuberculosis endangered, if they did not void, death claims.

The Maryland Tuberculosis Commission secured a similar confession from another physician, whose consumptives were often certified as having died of pneumonia. He argued that the statement was not essentially false, since pneumonia often terminates the lives of consumptives.

One of Baltimore's very distinguished physicians has told me of the harrowing sensations which he himself more than once experienced after having certified to death from tuberculosis, and so extinguished the only asset of an impoverished family. He thinks that the rewards of virtue are not so sweet when one's veracity helps to compound so great an injustice.

THE SANATORIUM TREATMENT OF PHTHISIS*—The author asks, and attempts to answer, the question, "Is It Worth While?" It is a very suggestive paper, and is the subject of no less suggestive comment by the editor. Dr. Ransom makes an affirmative answer to the inquiry, and the major part of his paper is devoted to a consideration of sanatorium statistics. He points out quite clearly the defects and fallacies of these numerical statements, and one concludes that Dr. Ransom's favorable view of sanatorium treatment is based chiefly upon personal impressions.

The editor believes that it is not possible to justify by statistical evidence the free expenditure of public money on care of the tuberculous poor in sanatoria. When the wide scope of this particular agency in the antituberculosis campaign has come into view, demand will be made for very definite proof of economic profits, and this proof can only be given in statistical form. Comparable records in great mass, representing not only the results of sanatorium treatment, but also the economic relations

* Dr. W. B. Ransom, *Brit. Med. Journal*, Jan. 14, 1905.

of other modes of treatment, will be needed. Such evidence is not now accumulating. There is no substantial agreement as to classification of cases, or of results. The nomenclature is quite diversified, and marked differences exist as to the significance of such words as "incipent," "advanced," "arrest," "improvement," "cure," "able to work," "economic cure." "Economic cure," the author thinks, is an especially dangerous phrase.

The confusion sure to arise if sanatorium records continue to be made in this haphazard fashion has been considered in this country by the American Climatological Society. To reduce to narrow limits the error inevitable in even the most careful analysis of testimony from many observers would be an important work for the National Association for the Study and Prevention of Tuberculosis. It could be done by securing the general adoption of a uniform and clearly defined nomenclature.

CANADIAN NOTES.

JOHN A. AMYOT, M. D.,
Provincial Board of Health of Ontario.

REPORT OF THE GRAVENHURST SANATORIUM.—Dr. Parfitt in his report of the results obtained in the treatment of the cases coming under his charge in the Muskoka Free Hospital for Consumptives. In two years 261 cases were admitted of all types. Forty-seven of the cases either remained less than a month in the institution or were admitted only for instruction and to die. Of the 169 remaining in the hosiptal one month or more, only 30 cases were in the incipient stage, 91 had advanced disease and 48 were far advanced cases.

Of the 169 cases discharged, following Dr. Trudeau's terminology and definition, they were classified as follows: 34 cases "disease arrested," 57 cases "much improved," and 78 cases unimproved. Doctor thinks that amongst those classed under disease arrested that several might safely be looked on as cured. Many of the advanced cases have done very well. The average length of stay for all cases so far admitted (two years established) is 163 days.

SANITARY ENGINEERING.

ROBERT SPURR WESTON,
Boston.

WATER SUPPLY AND SANITARY CONDITION OF INDIANAPOLIS.—Indianapolis is supplied by a private company with deep well and filtered White River water. The Water Company has had to contend both against the pollution of the river by straw-board refuse, and also the continued opposition of the citizens. It has spent large sums in improving its supply; nevertheless the opposition of the citizens became so strong, especially after the typhoid fever epidemic of last spring, that a joint commission of competent experts, consisting of Mr. George W. Fuller for the Company, and Dr. C. E. Ferguson and Mr. B. J. T. Jeup for the City, was appointed to investigate the character of the supply and the general sanitary condition of the City; therefore comprehending the degree of the Company's responsibility for the recent epidemic.

The vital statistics of the City were so imperfect that it was impossible to ascertain the history of the epidemic by this means. Cases of fever were often unrecorded by the physicians. Sometimes they were not reported until after the patient's death. There were two conditions, however, which rendered the typhoid statistics of comparatively little importance.

First: In this city of 200,000 people there were only 13,500 water services, while about 25,000 private wells were in use.

Second: There were only about 8,800 water closet connections.

Had the company furnished unfiltered White River water, the sanitary character of the supply would have been better than the character of the surroundings of the majority of the homes of the city. The company has always furnished water of good sanitary character to the best of its knowledge, and was exonerated by the Commission.

It is blameworthy that this large, well sewered and well watered city should have its health menaced by open privies, cess-pools and wells of unknown or doubtful history. The

laxness of the physicians in not reporting cases of typhoid is to be condemned. With better statistics, conditions bad for the health of the community could be more promptly recognized and done away with.

ANALYSIS OF ILLINOIS WATERS (2).—This report surveys the present condition of Illinois water supplies drawn from lakes, streams and wells; the determination of the normal condition of unpolluted waters and the formulation of data for judging the quality of potable waters. The report is divided into three main parts:

1. A brief consideration of the sanitary conditions of the ordinary ground waters, and matters relating thereto,—accompanying this there is a paper upon "The Geology of Illinois, as Related to Water Supplies," by Prof. Charles W. Rolfe.

2. Results of mineral analysis of some 460 samples of water, —mainly from wells of considerable depth.

3. A report of the investigation of the surface waters of the State relating to the Illinois River and some of its tributaries.

This report was about the last work of the late lamented Professor Palmer.

EXPERIENCE WITH THE COPPER SULPHATE TREATMENT AT HANOVER, N. H. (3).—During the summer of 1904 the upland water supplied to Hanover developed a fishy odor produced by algae. Water contained 600 organisms per c. c. Author advised trial of copper sulphate treatment, which was made. Treatment on July 18th reduced the algae 90 per cent. twenty-four hours after treatment, and after sixty hours no organisms could be found. Algae could not be found for ten weeks, but then began to be present in very small numbers during the last of September, after a drought which caused a reduction of the contents of the reservoir from 100,000,000 to 70,000,000 gals. The improvement in quantity was immediate, and no fish were killed. One part of copper sulphate to 400 parts of water was used.

ST. LOUIS WATER COAGULATION PLANT (4).—The St. Louis water supply, formerly subjected to plain subsidence only, is now clarified by subsidence wth the aid of a coagulant which has only quite recently come into use in connection with water supplies,—namely, ferrous sulphate, followed by lime. On the average, about 1.75 gr. of ferrous sulphate and 6.9 gr. of lime suffice to coagulate and clarify the water. The precipitate settles more rapidly than that produced by sulphate of alumina. The plant is designed to treat 120,000,000 gal. per acre per diem. The final product has only a slight turbidity and contains very few bacteria. The cost of treatment is quite low and can be reduced. It is believed that this process will make filtration unnecessary. However, should filtration become desirable in the future, it would find the greater part of the work of purification accomplished by these devices.

THE COPPER SULPHATE TREATMENT FOR TYPHOID BACILLI (2A).—It is announced that the value of copper sulphate as a destroyer of typhoid fever bacteria in water supplies has not been officially vouched for by Dr. George T. Moore of the U. S. Department of Agriculture,—editorials and other statements in the daily press notwithstanding.

CHARLES RIVER BASIN (6).—In 1903 the Charles River Dam Commission (7) recommended that a dam be built across the Charles River at Craigie's Bridge, to maintain it at a permanent elevation of about two feet below mean high tide. The dam will be of earth, retained between masonry walls. The top will be of varying width and will be laid out as a park of 6.5 acres, with a roadway 85 ft. wide running through it. There will be a small boat lock at the Cambridge side, and a lock 350 ft. by 45 ft. for large vessels at the Boston side of the basin.

Two intercepting sewers will collect the drainage on each side of the basin and will discharge below the dam. The two canals which now connect with the river are to be dredged and are to have their banks improved. This basin (area 830 acres, shore line 177.5 miles) forms the center of and its bordering drives make connections with the whole Metropolitan Park System.

Henry S. Prichett, Henry D. Yerxa and Joshua B. Holden are members of the Commission. Henry A. Miller, M. Am. Soc. C. E., is its chief engineer, and F. B. Stearns, M. Am. Soc. C. E., its consulting engineer.

NEW YORK'S ADDITIONAL WATER SUPPLY (5).—Present plans propose the immediate construction of a large storage reservoir at Esopus Creek, a 300,000,000 gallon aqueduct to the Borough of the Bronx, a 14,000,000,000 gallon reservoir in the Bronx, large conduits from the Bronx Reservoir to both Manhattan and Brooklyn Boroughs, a reservoir on Long Island and distribution mains in four of the five boroughs of the city. The estimated cost is about $90,000,000.

LABORATORY WORK.

FREDERIC P. GORHAM,
Associate Professor of Biology, Brown University, Providence, R. I.

THE DIRECT MICROSCOPICAL EXAMINATION OF BACTERIA.—The question frequently presents itself to those making bacteriological analyses of water, milk, sewage, etc., whether our methods of plating out samples really give us accurate determinations of the numbers of bacteria present. Does the number of colonies really represent the number of bacteria in the sample? Do all bacteria which may be present grow on our regular culture media? Winslow, in a paper read before the Society of American Bacteriologists at the Philadelphia meeting, 1904, and soon to be published in the Journal of Infectious Diseases, (with G. E. Wilcomb), attempts to answer these questions and has devised a method for the actual enumeration of all bacteria present in a sample by direct microscopical examination.

"One-twentieth of a cubic centimeter of the liquid to be examined is discharged from a sterile graduated pipuette on a carefully cleaned coverglass of known diameter. This is dried in the air, fixed, and stained in the usual manner with carbolfuchsin. The bacteria in ten square fields, 0.1 mm. on a side,

are counted by the aid of a Sedgwick-Rafter micrometer and the total number determined by multiplication. This method is rapid, easy, and accurate, but applicable only to fluids like sewage which contain 25,000 or more bacteria per c. c. The results obtained when pure cultures are examined check very closely with those of the plate method even when the number of bacteria is decreasing very materially. Thus it appears that dead bodies of bacteria are quickly removed in the presence of other living germs and introduce no serious error. On the other hand, sewage and sewage effluents show numbers, 10 to 100 times as high as the plate count, due mainly to the inclusion of forms which do not grow on ordinary media."

SYNTHETIC CULTURE MEDIA.—In our study of the bacteria from the hygienic standpoint we are apt to overlook the fact that in these minute organisms we have an opportunity of getting a very close insight into the exact chemical changes which are taking place in the cells. We are able to feed them wth certain compounds the exact chemical constitution of which is known, and we are able to analyze the contents of the cells themselves as well as the products resulting from their growth. In order that these analyses have any value, however, other media than those usually employed must be used. In spite of the efforts of the Bacteriological Committee of the American Public Health Association to bring about the adoption of uniform methods for preparing culture media, the fact still remains that uniform methods are of no avail unless the substances entering into the media are of uniform composition. The meat, peptone, gelatin, and agar vary much in their composition, and it will be impossible to secure exactly uniform media, at least from the chemical standpont, as long as these substiances are employed in their present form. Robin* has suggested that an attempt be made to get the manufacturers of the meat extracts, gelatin, etc., to put up special lots for the use of bacteriologists, which could be guaranteed uniform. A much better suggestion and one which will in time find favor with

* Centralbl. f. Bakteriol, etc., 2 Abt., Jena, 1904, xlll. 228.

bacteriologists, especially those working along chemical lines, is the adoption of proteid free media, made by the synthesis of the salts which are necessary for bacterial growth.

Many authors have published formulae for such solutions which up to the present time have of necessity been liquids. No solidifying substances whose chemical composition could be exactly determined and controlled had been devised. Dr. Erwin F. Smith in a communication read before the American Association for the Advancement of Science at its Boston meetings in 1898* suggested the use of a starch jelly, and more recently Dr. M. X. Sullivan, in a paper read before the Society of American Bacteriologists at its Washington meeting, 1902, described a culture medium made by adding the various nutrient salts to a solution of sodium silicate. This gives a solid medium, non-liquefiable, it is true, yet extremely useful in determining the chemistry of the bacterial growth. Dr. Sullivan used this medium in working out certain problems connected with the production of bacterial pigments.

This silicate jelly has been still further modified and improved by Dr. Erwin F. Smith and will be described in his monograph on the Bacterial Diseases of Plants. (Carnegie Institution.) It is easy, by his method, to prepare a silicate jelly free from glycerine, and at the same time having a moist, smooth surface well adapted to the growth of many bacteria.

The use of some such solidifying medium as this silicate jelly will undoubtedly be found advantageous in studying many of the problems connected with the chemistry of the bacterial cell.

* Proc. Am. Asso. Adv. Sci. Boston Meeting, 1898, xlvii. 411.
† Science, N. S., 1903, xvii., and Centralb. f. Bakteriol, etc., 1 Abt. Jena, 1903, xxxiii. 277, and Centralbl. f. Bakteriol, etc., 2 Abt. Jena, 1903, x. 386.

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THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston, March, 1890, with the following objects; The advancement of sanitary science; the promotion of better organization and co-operation among local boards of health, and the uniform enforcement of sanitary laws and regulations

THE JOURNAL OF THIS ASSOCIATION has for fifteen years faithfully reflected the views of the public hygienists of Massachusetts. With the November issue of the year 1904, the encouragement received from many hygienic quarters induced the Association to undertake the expansion of the Journal to a national standard, with the co-operation of many noted sanitarians as editors. A new title was selected, while the older and well-established title was retained also.

The dates of publication are FEBRUARY, MAY, AUGUST *and* NOVEMBER *of each year.*

THE JOURNAL will contain the papers read at the meetings of the Association, papers contributed by hygienists, reports of the discussions, editorials, abstracts, reviews and hygienic notes of professional interest. Subscription rates, $1.00 per year. Reprints furnished at cost price.

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All communications concerning the ASSOCIATION should be addressed ta the Secretary of the Association, JAMES C. COFFEY, CITY HALL, WORCESTER, MASS.

All bills not relating to the Journal, and MEMBERSHIP DUES ($2.00 per year), should be sent to the Treasurer of the Association, DR. JAMES B. FIELD, 329 WESTFORD ST., LOWELL, MASS.

EDITORIALS.

"DIRT" AS A SOURCE OF DISEASE.

"Dirt," in the sense of human excrement, has been considered at length by Professor Sedgwick in an excellent series of articles, which have appeared in this journal for some months past. The present article considers dirt and dust in the more ordinary and usual meaning of those terms.

The objections to dirt and dust are three in number, the aesthetic or sensory, the psychical or moral, and the hygienic. The aesthetic objections are optical, as when agreeable colors or lines are obscured by dirt or dust; second, tactile, as when something feels gritty or greasy, which should not feel so; gustatory, as when one can "taste dust in the air;" olfactory, as when one smells decomposing dirt, and sometimes auditory, as when a machine purrs or clacks from dirt in the bearings. But dirt is simply matter out of place; the oil that on a pair of white kid gloves is "dirt," would be, in the bearings of a machine, a saving grace. Fresh morning dew mixed with a little pure sand or clay "dirties" one's shoes, and one proceeds to "clean" them by daubing them with a mixture of grease, soot, and often saliva, which, carefully smoothed by rubbing until it shines, is considered quite ornamental.

The psychical objections to dirt and dust lie chiefly in an association of ideas between dirt and dust on the one hand and carelessness, laxness and slip-shod methods on the other. A dirty man is objectionable from this standpoint because of the implication from his appearance that he is "sloppy" in other things as well. Yet a battle-stained hero fresh from the field is adored for the very dirt and dust with which he is covered, because in this case, the significance of the dirt is the reverse of its ordinary significance. The dirt and dust which on a locomotive engineer is a symbol of his responsible, and to some minds,

even romantic, occupation, would, in the case of a banker, disqualify him for business.

The hygienic objections to dirt and dust are based on the external action of its particles in clogging the mouths of the ducts of excretory glands of the skin, irritating the eyes, producing chafing between skin surfaces in contact, etc., and their internal action, varying with the size, shape and material of which these particles are composed, from practically nothing to severe irritation, upon the mucous membrane of the nose, throat and lungs and intestines. Here the mere mechanical irritation, as in the case of fine sand, may produce severe discomfort. Certain chemical dusts may, by absorption, produce specific poisonings, and in any case, irritation set up in such ways, probably tends to make more easy the operation of harmful bacteria, if these should reach the irritated membranes. Bacteria of some form or other, generally harmless, sometimes, if the right conditions be provided, harmful, are likely to be present in the mouth, nose, throat and intestine of everyone, and dirt or dust, not itself infected, may, on reaching the mucous membranes, irritate them sufficiently to permit the harmful action of bacteria already present there.

As distinct from the conditions outlined in the last paragraph, the actual transmission of disease through dust and dirt is probably the smallest and least important of all the objections to them. Dust and dirt can transmit disease only when infected, and infected dust and dirt forms only a very small proportion of the total dust and dirt in the world. Tuberculosis may sometimes be conveyed in this way. Garden mould (in some sections of the world), if admitted to some forms of wounds may give rise to lockjaw because the tetanus organism is in some places a normal inhabitant of the soil. Typhoid-infected excreta, transferred by food, drinks, or otherwise, to the mouth may transmit typhoid fever. But in general, the typical infectious diseases of the temperate zone, diphtheria, scarlet fever, tuberculosis, and the rarer smallpox, are not commonly conveyed otherwise than pretty directly from patient to patient. The older ideas

that dirt and dust would or could in themselves generate disease is now quite as thoroughly exploded as the hypothesis of spontaneous generation. Dirt and dust are enemies to progress, refinement, civilization, and sometimes to health, but they do not in themselves propagate or even to any great extent transmit the ordinary infectious diseases. The presence of bacteria, when, as is usual, they do not belong to any of the specific disease-producing forms, adds no great objection to dust, for bacteria are present already in the nose, throat, etc., of every one, in milk, water, foods, etc. The degree of legitimate fear from the standpoint of infection with which any given aggregation of dirt or dust may properly be regarded, is proportionate entirely in each case to the number and kinds of opportunity of infection from diseased persons to which the particular dust or dirt in question has been exposed. To illustrate by reference to two extremes, the infectiveness of the dust and dirt of a crowded tubercular hospital ward is enormous compared with the dust and dirt of an Arizona desert. Of course, all intermediate grades of infectiveness occur.

Dirt, in the sense of human excreta, is like other dirt, dangerous only when infected. The safe rule to follow, however, is to consider all such excrement "guilty until it is proved innocent." In the case of the accumulated excreta of communities which constitutes "sewage," such an assumption is probably always more or less correct at some time or other. Since it is impossible to say of any given sewage at any given time that it is not infective, it is safest to regard it and handle it always as if it were infected.

INDIVIDUAL FACTORS IN HYGIENE.

There are three sets of individual factors in hygiene.

1. Those depending on what one wants to get out of life.

2. Those depending on the race, climate, age and sex of the individual.

3. Those depending on the individual peculiarities of one's tissues,—peculiarities by reason of which "one man's food is another man's poison" in all departments of hygiene.

1. A man who wants to get out of himself the largest amount of work possible will adopt hygienic rules quite different from those of the man who gets his satisfaction not in work, but in variety. "If you want to keep yourself in the pink of condition and secure a rounded development of your body, you should do so and so," says the trainer. "But I don't," one may reply. "I like better the kind of life that entails some ups and downs and development along certain lines—not all."

One cannot advise a man how to travel until one knows where he wants to go. So it is with hygiene.

2. Hygienic rules cannot be laid down without reference to race, climate, age and sex. The hygiene of Orientals is not that of "Anglo-Saxons," and in all probability ought not to be. Hygiene in the tropics is certainly different from that of colder countries. The adolescent years have surely their own special needs. These factors when combined with differences in age and sex sub-divide and specialize the problem of hygiene until it becomes almost as complex as the organization of modern industry. We can no longer hope for an universal hygiene that shall be other than uselessly vague. When we work out a hygiene for Americans of the temperate zone, it will not be binding on Orientals or on any tropical people. The rules for city folks will, in all probability, be very different from those for country folks. The hygiene of those under 40 will probably be found materially different from that suitable for septuagenarians, and so on.

3. But besides the individual factors introduced by personal ideals and by environment (taken in its broadest sense) there is another set of differences which separate us man from man as distinctly as our handwritings or our voices. These differences can be more easily exemplified than defined. The rate at which we live is a case of what I mean.

One man walks, talks, eats, digests, rests more rapidly than another. There is no single normal rate any more than there is for pulses. A's rate of walking is as easy for him as B's quicker and C's slower pace. A gets his night's rest in eight hours, and to all appearances he gets in that time as much rest as B does in ten hours and no more than C does in six.

These are quantitative differences, but the qualitative divergence is just as clear. What rests you tires me. My arrangement of meals will not suit you. The exercise which is good for you disagrees with me.

Do these manifold differences make it impossible for us to lay down any rules? General rules, I think, remain. A man must get some food, some rest, some air, but in all the essential particulars which make the difference between splendid health, moderate health, and rather poor health, I believe the individual is, and must be, a law unto himself, as he is in politics and religion. There are ways, not only one way, of keeping well. To classify oneself is the paramount hygienic duty. Do you belong to the class of those who rested by change of work or do you not? Are you one of those who is benefitted by going without breakfast, or are you not? What is your proper allowances of sleep? What is your best recreation? No doctor can find out for you the answers to these questions half as surely and swiftly as you can find out for yourself by instinct and experiment.

To know the answer to these and similar questions is more important, I think, than to know how to read and write. Nothing that I know of would so gladly benefit the health of the community as a study by each individual of his individual hygienic needs. Our right of private judgment does not always lead us to very intelligent conclusions in politics or religion, because too often we are not very vitally interested in these matters and accept a party slogan or an inherited creed without qustion or investigation. But in our own health we are most of us unmistakably and unfeignedly interested and with a little guidance we could, I believe, arrive at much more successful

methods of living by our own investigations than by following another person's set of rules. The physician's business cannot well include the settling for every man of such intimate and personal questions as how to keep well. The physician is of value when we are sick, but when we are well it is as awkward and difficult for him to find for another man his proper way of fitting himself into the unique environment, temperament and individuality with which he finds himself endowed, as it is to tie another man's necktie for him. Such an effort is a wasteful and inconvenient one.

Now I do not think that science need be wholly dumb and passive in this matter. She can suggest alternatives worth investigating. She can tabulate by statistics the plans of living which have actually turned out to work well and plot them like a set of roads on a map. "On or near some one of these roads," scientific hygiene will then say, "You will probably travel if you want to be well. Look into them—try them as a man looks up a neighborhood for building a house or chooses a profession. Here are the likely paths."

This means that someone must undertake an enormous labor of statistical inquiry into the actual habit of healthy Americans. How have the hygienic successes of this country been achieved? What plans of living as regards food, sleep, water, air, exercise and recreation have actually proved workable. I think it will turn out that there are not more than half a dozen leading "centres of success" (like the chief centres of population) and that through one of half a dozen plans of life most hygienic successes have been achieved. To ascertain these facts I propose to devote a good deal of time and money in the next years. I want to collect statistics portraying the actual habits of 50,000 of the healthiest Americans in all parts of the country. Through my friends in and out of the medical profession, I think I can collect this body of data. Later on I may be appealing to some of you gentlemen to assist me in this investigation.

RICHARD C. CABOT.

APRIL QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The quarterly meeting of the Association was held at the Brunswick Hotel, Boylston street, Boston, on Wednesday, April 26, 1905, Vice-President Samuel H. Durgin presiding.

Mr. James C. Coffey, Secretary, read the records of the January meeting, and they were approved.

VICE-PRESIDENT DURGIN: The Executive Committee recommends the following names of persons proposed for membership in the Association:

H. C. Bullard, North Attleboro.
Dr. S. O. Pilling, Newburyport.
Dr. George E. Norton, Cambridge.
Dr. Frank A. Murphy, Taunton.
Dr. J. Forrest Burnham, Lawrence.
Dr. F. B. Gunter, Chelsea.
Dr. R. V. Sawin, Brimfield.
Dr. E. Frank Guild, Chelsea.
Dr. Richard M. Raymond, Framingham.
George E. Harrington, Sudbury.
Dr. Thomas Piggott, Winthrop.
Arthur A. Hayden, Melrose.
Dr. M. V. Pierce, Milton.
William O. Safford, Salem.

On motion of Mr. Coffey, the gentlemen named were elected to membership.

VICE-PRESIDENT DURGIN.—We are fortunate in having a gentleman to speak to us this afternoon upon a live subject throughout the State, and perhaps throughout the country. I

have the pleasure of introducing Prof. William T. Councilman of Harvard University, who will read a paper on "Cerebro-Spinal Meningitis."

CEREBRO-SPINAL MENINGITIS.

By Prof. William T. Councilman, of Harvard University.

I should probably apologize before such an audience for treating this subject from an anatomical, rather than from the epidemiological point of view. I think, however, there is something to be said in favor of taking the subject from the anatomical point of view, because this gives us certain clues towards the understanding of the disease.

Cerebro-spinal meningitis, especially the epidemic form, is a disease of which we really know very little. We know something anatomically about the process, we very probably know the micro-organism which produces it, but that is all. Just under what conditions the micro-organism produces the disease, and how it reaches the tissues, are points on which we are still very ignorant.

The tissue which is invaded is the tissue which covers the brain here in my hand. (Exhibiting specimen.) The membrane which is affected is the pia arachnoid which covers the brain and dips down between the convolutions. The pia arachnoid is a peculiar tissue. The side which corresponds to the dura, forming one side of the subdural space, is smooth, resembling the inside of a lymph vessel. The side in contact with the brain is composed of a definite layer of connective tissue, and between the two is a loose connective tissue filled with spaces. All of the blood vessels of the brain ramify in the pia arachnoid, giving off vessels which enter the brain. The larger vessels are accompanied by processes of the pia arachnoid. The capillaries given off from these have no accompanying tissue.

The pia arachnoid is always filled with a fluid, the cerebro-spinal fluid. That fluid is secreted by a structure, the choroid plexus, which forms a part of the membrane which passes into

the ventricles of the brain. This fluid is constantly being secreted. It enters into all of the spaces of this membrane, so that both brain and cord are almost floating in the fluid. The fluid must escape in some way, and the manner in which it passes out from this tissue gives us a clue to the connections which exist between the pia arachnoid and the other tissues of the body. The spaces which we find within this membrane are continuous with the perineural lymphatics of the cerebral nerves and with the perivascular lymphatics. In this way there is a direct lymphatic connection between the spaces in the membrane here and the lymph spaces in the remainder of the body. The fluid in the meshes of the membrane can also pass into the longitudinal sinus by oblique valve-like openings.

Micro-organisms can enter into the pia arachnoid in various ways, and can produce acute inflammations of it. A great number of organisms can so act. For instance, in going over our cultures made from the meninges in cerebro spinal meningitis, we find cases in which pneumococci, staphylococci, the streptococci, in fact, all of the ordinary pus organisms, have been the causative agents. The tubercle bacilli may enter into the membrane, producing tubercular meningitis. We have had cases in which meningitis was produced by the anthrax bacillus, cases in which it was produced by the typhoid. In all of these different forms of meningitis which are so produced there is a great deal of similarity in the gross appearance, so that in the place of showing you the lesions from cases of epidemic cerebro-spinal meningitis, I am going to show you some of the lesions which have been produced by one of the ordinary pus organisms. It would be impossible to distinguish microscopically the different varieties of meningitis.

How are these organisms to get into the tissue? Of course, they can enter into it directly from without, in cases of wounds involving the membranes and by continuity of affected tissue, as in erysipelas of the scalp. In cases of otitis media and mastoiditis, organism may enter either by continuity or by lymphatics. One of the most common causes of meningitis in general

is inflammaton of the middle ear, with mastoiditis. Of course, organisms may enter into the membrane conveyed thither by the blood. This is not a common method. It is comparatively rare that we find cases of acute meningitis accompanying infections in other parts of the body. When organisms enter into the blood and are conveyed to the brain, they are far more apt to produce acute inflammation in the brain itself than in the membranes over it. We find the same thing experimentally. Thus experimentally in animals, by the injection of staphylococcus into the lung, and by various other organisms, it is possible to produce experimental lesions in the brain. Of course, sometimes those may be accompanied by inflammations of the meninges, but we are far more apt to have inflammations of the brain itself produced by blood infection.

The epidemic cerebro spinal meningitis appears both in sporadic forms and in epidemics. It differs from the ordinary cases, not only in its etiology, but in appearing in epidemics. I pass around a specimen which shows a slice of the cortex of the brain, taking the membrane with a portion of the brain substance. If you examine this you will find that the outside of the brain is so covered by a thick, yellowish deposit that in places the convolutions cannot be seen through it. The specimen has been so preserved that the fresh appearance is perfectly retained. The specimen is from a case of meningitis which was produced by the streptococcus, but it shows exactly the same condition which would have been produced by the other organism, the meningococcus.

The next specimen shows a section of the brain made lower down so that the convolutions of the brain here are cut in various ways, and you see the membrane dipping down between the convolutions. Wherever the membrane is you see there is the same sort of deposit which you saw on the surface. I will also call your attention to the redness of the tissue. The redness of the tissue is due to an injection of the blood vessels. The tissue is very much more hyperaemic than it normally should be, and looking at it closely you will see a number of tiny red

points. These tiny red points show that minute haemorrhages have taken place in the cortex.

Then there is another very interesting thing about the epidemic cerebro-spinal meningitis, and it is true to a less extent with the other forms of meningitis, that the damage is rarely confined to the outside of the brain, but in addition to this inflammation of the membranes we find there is a certain amount of inflammation of the brain also. The connection between the brain itself and this covering on the outside of it is so close that in the majority of cases we have some affection of the brain itself. The tendency for the infection to extend into the brain is more marked in cerebro-spinal meningitis than it is in any other forms.

We believe that the disease is produced by a micro-organism, a bacterium, which belongs to the micrococci. It is a very small organism, and it always occurs in pairs. It also occurs within the pus cells. The plates which I pass around and which most of you have probably seen show various relations of the organisms and the lesions.

There are very important points, I think, in relation to the organism. The organism is one which, in the first place, does not grow with great ease. On many of the culture media it does not grow at all. It grows on blood serum, and it grows on agar which has been mixed with blood. I have here a pure culture of the organism which was made from a recent fatal case. I will pass this around, and you will observe that on the surface there is a more or less smeary growth. You cannot see the individual colonies; they are so abundant here that they have all run together.

We find this organism both in spinal puncture and in the tissues in all cases of the epidemic cerebro-spinal meningitis. We do not find it in the other forms. Usually it occurs alone, but we have found it associated with other organisms.

When the lesions are studied microscopically we find the organism associated with them. The earlier and the more virulent the case is, the greater the number of organisms found.

In the very early cases, which die in two or three days, we find the organisms present in very large numbers. In the later cases of the disease, those which have lasted for a number of days, or two or three weeks, we may find comparatively few of the organisms, or they may be entirely absent.

Most of the laboratory animals are very slightly susceptible to infection with this organism. Both rabbits and guinea pigs are susceptible if very large amounts of pure cultures are injected into them. We once succeeded in producing acute meningitis in a goat by injecting a pure culture of the organism into the spinal canal. So that it seems to me that we can regard it as certain that this organism is definitely associated with the disease, that it is one of the causes of the disease. It is uncertain as to whether the organism alone is sufficient. It is very possible that there may be other and unknown conditions which render it possible for the organism to produce the disease.

I have told you that it was difficult to grow. It is also an organism of very feeble vitality and is easily destroyed. We made some experiments in 1898 with regard to the resistance of the organism, and we found that exposure to sunlight for a very short while was sufficient to destroy it, and exposure for a few days to the ordinary light of the room will destroy it. It will live for several days if kept in the dark. All sorts of antiseptics destroy the organism easily. The organism has never been found outside of the animal body, and the chances are that it could not live as a saprophyte.

The disease occurs both sporadically and in epidemics, which differ greatly in their extent and mortality. From 1898 to 1904 there have been 61 cases of meningitis in the Boston City and Massachusetts General Hospitals. In all of these cases the organisms have been carefully determined by culture. Twenty of these cases were produced by the diplococcus meningitidis, making it of the epidemic variety. These cases give us but little idea of the frequency of the disease. A great many cases recover, and many die without it being possible to determine the nature of the disease by autopsy. The mortality is less in the

epidemic cerebro-spinal meningitis than in any of the other forms. Tubercular meningitis is always fatal, and the same is probably true of the cases which are produced by the ordinary pus organisms. I have been able, in going over the literature, to find no case in which pyogenic organisms were found in the fluid withdrawn by lumbar puncture, which have recovered. The mortality in epidemic cerebro-spinal meningitis varies from 20 to 80 per cent. It is higher in epidemics than in sporadic cases. It might at first seem that the organism was kept alive in the period between epidemics by the sporadic cases and infection followed from case to case. On closer examination this does not seem probable. In an epidemic it is comparatively rare that we find several cases from the same house or that the disease is especially prevalent in certain localities. It seems probable that density of population and bad hygienic surroundings favor the extension of the disease, but all experience in hospitals goes to show that there is but little tendency for the disease to spread by close infection. The nurses, attendants, and physicians who have charge of such cases have generally remained free from the disease. It also does not seem that the sporadic cases are sufficiently numerous for the disease to be kept alive by extension from case to case. If the organism were capable of existing as a saprophyte outside of the body it might be spread by sporadic cases, but all the evidence is opposed to this. It is of great importance to find that the organism is not confined to cerebro-spinal meningitis. There are a great many reports in the literature showing that the organism may be found in the nose in cases of acute coryza, and also under normal conditions. Many of these reports are unreliable because the organism has been confounded with a common inhabitant of the nose, the micrococcus catarrhalis which it closely resembles morphologically, and can only be distinguished from it by cultures. There are a number of cases, however, which are free from criticism, showing the presence of the organism in the nose with or without coryza. I know of one case in which the organism has been found in cultures made from the nose extending over a period of two

years. What we know now of the disease and the organism causing it leads me to believe that the micrococcus meningitidis may be a not infrequent inhabitant of the nose in normal individuals, that it may be the cause of acute coryza; that under certain conditions the organism may pass from the nose into the meninges, probably extending by means of the lymphatic connections and give rise to cerebro-spinal meningitis. The great extension of the disease which occurs in epidemics may be due to the fact that under certain conditions, the nature of which we do not know, either the number and the virulence of the organisms may be very greatly increased, or there may be conditions affecting large numbers of individuals which increase their susceptibility, and then the number of infections increase. It is very probable that we have to do with very analogous conditions in pneumonia and also in influenza.

VICE-PRESIDENT DURGIN: This paper is now open to discussion. We shall be glad to hear from Dr. Morse, who has seen a good many of these cases about the State in the last few weeks.

DR. MORSE: Mr. President, Members of the Association: It is always of considerable importance to local boards of health to know just how many cases of this disease have occurred within past years, how many are present in the State today, and what can be done to prevent its further spread and to cure those who are already affected with it.

If we review the figures for the last ten years we will find that this period includes the large epidemic of 1896 and 1897, which was so carefully studied by Dr. Councilman and his assistants. Reckoning up the deaths of this ten-year period we find that there were 3540 deaths from 1895 to 1904 inclusive, an average of 354 deaths, or one for almost every day in the year in this State. We have recently learned through the newspapers that at the present time we have been having an increased number of cases, but if the same fatality keeps up for

the remainder of the year that occurred during the first three months, we will only have 364 deaths for the present year, an increase of only ten over an average of ten years, and surely not an alarming condition.

These cases have been distributed more or less throughout the State. The Metropolitan district since the first of January has had 66 cases, the district to the north of Boston and the Metropolitan district has had 76 cases. In the middle of the State there have been 9 cases, south of Boston 14 cases, and west of the Connecticut river 4 cases. The geographical district, comprising that north of Boston, has had the largest number of individual places infected, and also the largest number of cases. It has been present in Haverhill, Lawrence, Lowell, Lynn, Danvers, Chelmsford, Salem, Beverly, Peabody, Essex, Hamilton, Gloucester and Wakefield. In the Metropolitan district it has included practically all the cities of the district. In the middle part of the State, Worcester, Westboro and Athol have had cases; west of the Connecticut river, Holyoke, Pittsfield and Lenox, and south of the Metropolitan district, Harwich, Attleboro, Fall River, Franklin, Plymouth, Millis and Braintree. So that the disease can be considered as quite widely distributed throughout the State.

It is also of interest to know just what can be done in the cure of cases of the disease. Late in March, from reports received of the treatment of cases in other parts of the country, it was found that such cases treated with diphtheria antitoxine, when used in large amounts and frequent doses, showed a greater rate of recovery than from any other treatment. Consequently the State Board of Health very willingly distributed a large amount of antitoxine during this present month for the treatment of cerebro-spinal meningitis cases, with the understanding that some returns should be sent back to the Board, in order to form some definite opinion as to the results of this treatment. The diphtheria antitoxine has been distributed in amount of over a million antitoxic units, but the returns which have been so far brought back to the State House have been so very

slight that no available data is at hand. In the city of Lowell, however, where there have been some 50 cases of the disease, fairly concise records have been taken, and I have analyzed them to present to you. Of these 50 cases 22 were children under 5 years of age, five were from 5 to 10, sixteen were from 10 to 20, six from 20 to 30, and only one over 30 years of age. Thirty-seven were among males and thirteen among females. Twenty-four have died, nineteen have recovered, and seven still remain under treatment. Diphtheria antitoxine has been used in a large number of these cases, and of the twenty-four deaths, seven, or 29 per cent., were of those who were treated with diphtheria antitoxine. Of the nineteen recoveries ten, or over 50 per cent., were treated with antitoxine in various amounts. These amounts of antitoxine have varied from an injection of 3000 units to one of 160,000 units, an amount unparalleled even in the treatment of cases of diphtheria. I am able to say that this case which has received 160,000 units of antitoxine has now been under treatment for nearly a month, and although it has apparently passed the acute symptoms of the disease it has recently developed some unfavorable conditions. One case recovered which had no antitoxine; another case died which had 52,500 units of antitoxine, but the period after he was taken ill before he died was two and one-half weeks. Apparently the antitoxine may have increased the period during which he lived. So that the results of the use of antitoxine, so far as we know, do not offer very favorable recommendations in the treatment of the disease.

As far as the isolation of cerebro-spinal meningitis cases is concerned, we have thought it best, in view of the fact that we know so little about the transmission of the germ, that all cases should be quarantined, that other children in the same family should be kept away from school, and that when death occurs the funeral should be as private as possible. These conditions we consider best to carry out in order to take every precaution which can be taken to prevent the further spread of the disease.

DR. CHASE: Mr. President, just a few words about the experience with cerebro-spinal meningitis in Brookline. We have had since late in January eleven Brookline people who have been reported to have taken this disease. One of those was the case of Mr. Converse, a medical student, who was substituting for a week at the Boston City Hospital, and while there he was feeding a patient ill with the disease and contracted it, and died there. The first four of the Brookline patients died with the disease, and two others of the eleven have since died. The later cases, with one exception, are now well, or getting well. It was interesting to note that in the course of about six weeks seven patients came down with the disease in the most densely populated district in Brookline, an area bounded by 83 Boylston street and Pond avenue, and the mortality was very high there, four out of those seven patients dying of the disease and a fifth is now in a critical, if not a hopeless, condition. We have had now no new cases for nearly two weeks. When the little epidemic, or threatened epidemic, was at its height, our Board of Health prepared a circular of which 2000 copies were sent to the houses in the most congested districts by the police. I will not take your time to read the circular, but I will hand a copy of it to the reporter and it can be published in the proceedings. We think it did some good in the way of getting our people to clean up and keep their windows open and observe other sanitary precautions. We think now that the epidemic is at an end in Brookline.

Dr. Hill asks about the use of antitoxine. All of the Brookline patients, with exception of two who died within about 36 hours of the outset, were sent to Boston hospitals as early as practicable, and all of them received antitoxine treatment, and had lumbar puncture done on them while there. One of those that recovered had antitoxine treatment in Brookline before she went in, but she had it only for two or three days, and recovered at the Massachusetts General Hospital, where they went on with the same treatment. I believe in the value of diphtheria antitoxine in cerebro-spinal meningitis and feel that

our State Board of Health has been a help to us in this threatened epidemic by furnishing us this remedy.

TOWN OF BROOKLINE.

Office of the Board of Health,
Brookline, Mass., April 10th, 1905.

Cerebro-Spinal Meningitis.

To the Citizens of the Town of Brookline:—

Since January 30, 1905, there have been reported to the Board of Health nine cases of cerebro-spinal meningitis. Six of these cases were reported since March 9, and were found in that part of the town lying between 83 Boylston street and Pond avenue.

Since this disease prevails most in the more densely populated districts, where unsanitary dwellings or apartments are most numerous, especially those lacking sufficient sunshine and fresh air, both landlord and tenant should see to it at once that better conditions in these respects are secured. Over-crowding, damp cellars, sunless sleeping rooms, lack of cleanliness, poor ventilation and the presence of dust, all tend to make an epidemic spread. If these conditions are promptly done away with much good will be accomplished, and there will be no reason to apprehend an extensive epidemic.

By order of the Board of Health,

HORACE JAMES,
Chairman pro tem.

H. LINCOLN CHASE, M. D.
Agent, Board of Health.

DR. PIERCE (Milton): I could not help thinking when Dr. Councilman was reading his paper that his theory of the cause

for cerebro-spinal meningitis was consistent with the time of year when it most occurs, occurring mostly in the spring months, when we all know that coryza is much more frequent than it is at other times of the year, and also in the cities, where coryza is more common than it is in the country.

VICE-PRESIDENT DURGIN: The Boston Board of Health began its record of cerebro-spinal meningitis in 1897. There were 12 cases reported and 185 deaths in that year. In 1898 there were 30 cases reported and 97 deaths; in 1899, 59 cases reported and 88 deaths; 1900, 52 cases, 66 deaths; 1901, 43 cases, 54 deaths. In 1902, however, after one physician was cautioned as to the neglect in reporting cases, he brought the record up that year with 98 cases reported, and 62 deaths. In 1903 there were 35 cases reported, with 47 deaths; 1904, 44 cases, 37 deaths. But so far in 1905 every case reported has been examined by a physician from the Health Department. We have had during these four months 64 cases and 53 deaths. I think I am warranted in saying of those 64 cases reported and verified that they were very likely cases of cerebro-spinal meningitis.

Are there any more questions or remarks to be made upon this paper?

DR. NOYES: Mr. Chairman, I would like to ask, if it is in order, if anyone knows whether the lumbar puncture and withdrawal of the fluid is supposed to have any effect on the virulence or the course of the disease?

PROFESSOR COUNCILMAN: I think that the opinion is that lumbar puncture certainly does no harm, and that in certain cases it has done a good deal of good in relieving symptoms of the disease. Whether it has anything to do with recovery of the patient I do not know. Dr. Williams, who in 1898 did a great number of lumbar punctures in the disease, felt that it did do good in relieving, for a time at least, the symptoms of pressure.

DR. NOYES: That could be repeated two or three times without especial danger?

PROFESSOR COUNCILMAN: Oh, yes, it has been repeated a number of times.

DR. BOWERS: With reference to that particular question, I can report one case which occurred in South Berlin, near Clinton. The case was attended by Dr. Small of Clinton, and I had the privilege of seeing it in consultation. In that case the lumbar puncture was done twice, and cultures of the fluid showed the characteristic germ. The antitoxine was also used, two injections being given, but I do not know how many units were used. The lumbar puncture was followed by decided improvement immediately, that is, the rigidity and spasm and evidence of pain was immediately relieved, and the child, a boy of four years, was very much more comfortable from that time on and subsequently made a complete recovery.

DR. HUNTRESS: I wish to say that in our present epidemic in Lowell the lumbar puncture has been made in a great many cases, and it has always been followed by immediate relief, but we have come to the conclusion that there is nothing curative about it.

VICE-PRESIDENT DURGIN: Gentlemen, we are twice fortunate this afternoon. I know of no board of health within our section of the country that is not at times bothered to know how to treat cases from a legal point of view. For this reason I have sought the services of a gentleman who has consented to prepare and read a short paper on "Powers of Boards of Health, under Chapter 75 of the Revised Laws of Massachusetts, concerning Offensive Trades and Nuisances." I have great pleasure in introducing Thomas M. Babson, Esq., the Corporation Counsel of Boston.

POWERS OF BOARDS OF HEALTH REGARDING NUISANCES.

By Thomas M. Babson, Esq., Corporation Counsel, Boston.

In discussing the powers of boards of health under Chapter 75 of the Revised Laws, owing to lack of time and the complexity of the subject, I shall confine myself largely to stating general principles and then reading from certain cases showing the application of those principles.

Boards of Health cannot make acts, not prohibited by law, crimes. In morals and ethics certain things which are against the teachings of the Scriptures or of our own consciences are crimes, but legal crimes, crimes which are punishable by the courts, are offences against the laws of the land. Those laws must be passed by legislative bodies having the power under the constitution to pass such laws and prescribe penalties for the breach of them, and a man who is complained of for violation of such laws has a right to be tried before a jury of twelve men, who inquire into all the circumstances of the case and decide as to whether he has or has not been guilty of a crime.

The powers of boards of health, with some exceptions, are powers exercised under the police power, so-called, and in order to have a fair understanding of the extent of the powers of your boards it is necessary to have some idea of what the police power of government is and its limitations.

It being certain that under this chapter boards of health cannot make it a crime for a man to have stagnant water or brown-tailed moths or the nests thereof upon his premises, it follows that the offence which is punishable under sections 65 and 67 of this act is the offence which a particular individual commits in not obeying the orders of a board of health to remove the nuisance or source of sickness from his premises after those particular premises have been examined by the board of health and declared to be a nuisance and a source of disease. In order to understand this, in order to know why each particular case and each particular individual must be dealt with separately, we must

know something of the nature of the police power, something of its extent and something concerning its limitations, and I will therefore take up the subject of the police power and will undertake to define it so far as such an intangible and elusive thing has been defined by the courts.

The police power has been defined to be the power to govern men and things so as to extend protection to their lives, limbs, health, comfort and property. Also as the power of government inherent in every sovereignty and necessary to the self-preservation of the body politic.

This right must be clearly distinguished from the administration of criminal law or from police regulations and police authority, nor should it be confused with eminent domain, as has sometimes been done, or with the power of taxation. It is distinct from all of these. It is more despotic and broader in its action than the right of eminent domain, caring for the public health and morals of the community, restraining individuals from interfering with them, and when it is found necessary to take private property under the police power no compensation need be given to the owner unless expressly provided by statute.

It is much easier to realize the instances and sources of this power than to mark its boundaries or prescribe limits to its exercise. The Supreme Court of the United States and the Supreme Court of this Commonwealth, as well as of the other States, have constantly declined to define the limits of this power except so far as was necessary for the determination of the particular cases which were before those tribunals.

As the exercise of this power always tends to destroy or limit the constitutional rights of citizens, the right which they have under our constitution not to have any property taken from them without proper compensation, the right to have their offences passed upon by a jury of twelve men, and even their right of control of their own bodies or actions, it is always a question in every individual case where the police power is exercised whether that particular exercise of the police power is so reasonable and necessary that the constitutional rights of the in-

dividual must yield to the inherent right of every community to preserve the lives and health and property of its citizens. I will, therefore, for the sake of illustration, read from some of the cases where some act under the police power has either been declared a reasonable exercise of that power or an unreasonable exercise of it.

1. There is nothing necessarily unconstitutional in a requirement that landowners remove from their own land at their own expense, a nuisance which they neither created nor invited. Familiar examples of the exercise of this power are the statutes requiring the drainage of swamp lands at the expense of the owner, many times held constitutional.

Dingley *v.* Boston, 100 Mass. 544.
Bancroft *v.* Cambridge, 126 Mass. 438.
Nickerson *v.* Boston, 131 Mass. 306.
Davidson *v.* New Orleans, 96 U. S. 97.
Warts *v.* Hoagland, 114 U. S. 606.

For like reasons owners may be compelled to remove snow from the sidewalk in front of their property, although the sidewalks are part of a public highway and the abutters are not responsible for their care.

Goddard, petitioner, 16 Pick. 504.
Remken *v.* Fuehring, 130 Ind. 382
Carthage *v.* Frederick, 122 N. Y. 268.

In some States owners are compelled under penalty of criminal prosecution to exterminate noxious weeds on their lands.

Ill. Crim. Code, ss. 40, 41.
New York, Laws 1878, c. 49.
Agricultural Law, s. 83.

The constitutionality of these particular statutes has never been passed upon by the courts, but the subject has been before the courts, and I quote from an opinion.

The validity of statutes requiring an owner to exterminate noxious weeds, insects or animals on his own land must, like

all summary exercises of the police power, rest first on public necessity and second on not undue oppressiveness upon individuals.

Freund, Police Power, ss. 618, 619. "The rightfulness of the requirement to clear land of weeds and pests would depend upon the difficulty and expense of the undertaking. . . . The principle seems to be that where the natural condition of property threatens an imminent danger, which can be averted at reasonable expense or by reasonable restrictions, the owner may be required to do what is necessary to avert the loss."

If the requirement is unreasonable and oppressive, it is unconstitutional.

In *ex parte* Hayes, 87 Cal. 162, the following facts appeared: Ground squirrels were declared a nuisance by the Board of Supervisors of Contra Costa County, and all owners of land were required to exterminate them within 90 days, and thereafter to keep their lands free of them. A penalty for violation was imposed. The court, in its opinion, says:

"We regret exceedingly that we cannot see our way clear to uphold and enforce such an important and original piece of legislation. Indeed, it would give us great pleasure to see the power here assumed applied to snakes, tarantulas, ants, flies, fleas, and other reptiles, insects, and pests, which tend to make man's life a burden, and to have it exercised and enforced in every county in the State. But we are unable to see by what right or authority of law a board of supervisors can impose upon a landowner the burden and expense of exterminating animals ferae naturae on his own land, or elsewhere. . . . Such an ordinance differs materially from laws requiring an occupant of lands to keep them free from noxious weeds, or such as make it the duty of an owner of diseased domestic animals to kill them in order to prevent the spread of the disease. These are matters over which the property owner has control, and the requirements are reasonable and just."

Tiedemann in "State and Federal Control of Persons and Property," commenting on the Hodges case, says (p. 839): "The chief objection to this regulation would seem to be its unreasonableness."

2. If the Legislature or a duly authorized board declares that a certain kind of property or a certain occupation is under certain designated conditions a nuisance, the owner is entitled to be heard on the question whether those conditions exist.

If the Legislature or a duly authorized board declares that a certain kind of property or a certain occupation is, under all conditions, a nuisance, such an enactment is invalid unless it is a reasonable method of dealing with a public evil; but if it is reasonable and consequently valid, an individual affected is not entitled to show that his property or his occupation was not, in fact, a nuisance, but he is entitled to show that his property or his occupation was not within the terms of the enactment.

Belcher *v.* Farrar, 8 Allen 325.

The power vested in a board of health to forbid any trade which is a nuisance or hurtful to the inhabitants is a quasi-judicial power, and its exercise necessarily involves the determination of the question whether a particular trade falls within the category. No notice to the person affected is required by the statute. If the decision of the selectmen were final . . . "it would violate one of the fundamental principles of justice to deprive a party absolutely of the free use and enjoyment of his estate under an allegation that the purpose to which it was appropriated, or the mode of its occupation, was injurious to the health and comfort of others without giving the owner an opportunity to appear and disprove the allegation." But as the statute provided for an appeal to a jury on the whole question it is constitutional.

Commonwealth *v.* Patch, 97 Mass. 221.

Complaint for violation of a regulation of the Springfield City Council acting as a board of health in keeping one swine.

Defendant offered to prove that the keeping of one pig was not in itself a nuisance or a cause of filth. The court ruled that this, if proved, would not constitute a defence.

Held: A regulation of this kind must be reasonable; that is, not interfering with the liberty, property and business of the citizen more than is requisite to secure the lawful and proper object in view. In a thickly-settled city this ordinance was clearly reasonable.

Salem *v.* Eastern Railroad Co., 98 Mass. 431.

Action to recover money expended in clearing the obstructions from a certain pond which the board of health had declared a nuisance.

Held: As far as the removal of the nuisance is concerned the decision of the board is final, although the owner has no opportunity to be heard; but in judicial proceedings consequent thereon, he has a fundamental right to notice, and a hearing and the adjudication of the board is not conclusive.

Taunton *v.* Taylor, 116 Mass. 254.

Bill in equity to restrain the exercise of a trade declared a nuisance by a general regulation.

Held: It is within the power of the Legislature to confer authority on local bodies to act summarily for the protection of the public health. The rights of the person affected are preserved by allowing him an appeal to a jury by whose verdict the order may be altered, annulled or affirmed. The determination of the board of health is quasi-judicial. The allegation in the defendant's answer that the trade which he carried on was not a nuisance, therefore stated no defence which could have availed him at any stage of this cause.

Train *v.* Boston Disinfecting Co., 144 Mass. 523.

Replevin of certain rags, the question being as to the validity of a regulation of the Boston Board of Health requiring all rags imported from foreign ports to be disinfected at the expense of the owner.

Held: There are some things in themselves lawful which become nuisances from the offensive manner in which they are maintained or conducted. The owners of such are entitled to a hearing on the question whether their property is, in fact, a nuisance before they can be put to expense in abating it. But there can be no doubt of the right of the Legislature to pronounce, under its police power, certain things or certain acts, nuisances in themselves, and where anything is declared a nuisance by legislation, it is not competent for a party to show that it is not, in fact, one. The regulation was not unreasonable, and just as certain things may be pronounced nuisances *per se* certain articles also may be made always subject to quarantine regulation.

Langmaid *v.* Reed, 159 Mass. 409.

"A stable used for more than four horses may or may not be a nuisance, but whether it is or not, it is competent for the Legislature to say that it shall not be kept except in such places as the mayor and aldermen of a city or the selectmen of towns may permit and to confer upon a court authority to enforce this prohibition by injunction because stables in their nature are often offensive to the community and the use of them may be regulated by the Legislature."

Newton *v.* Joyce, 166 Mass. 83.

A statute providing that no person shall erect a stable for more than four horses in a city without license from the local board of health is constitutional, although there is no provision for compensation or for appeal from the decision of the local authorities.

Miller *v.* Horton, 152 Mass. 540.

Tort for killing a horse. A statute provided that in all cases of glanders, having condemned the animal infected therewith, the commissioners should kill it without an appraisal. They condemned and killed plaintiff's horse, which did not have glanders.

Held: Assuming that the Legislature had the power to declare all horses afflicted with glanders a nuisance and to order them to be killed summarily without compensation, it has not declared all horses nuisances, and plaintiff is constitutionally entitled to trial by jury on the question whether his horse, in fact, had the glanders. Although the emergency justifies killing the horse, the adjudication of the commissioners is not conclusive on the matter of compensation.

Lawton *v.* Steele, 152 U. S. 133.

A statute prohibiting the maintaining of nets under certain circumstances in the waters of a certain State and providing for the summary destruction of nets set in violation of the statute is constitutional. "To justify the State in thus interposing its authority in behalf of the public, it must appear, first, that the interests of the public generally as distinguished from those of a particular class, require such interference; and, second, that the means are reasonably necessary for the accomplishment of the purpose, and not unduly oppressive upon individuals. The legislature may not, under the guise of protecting the public interests, arbitrarily interfere with private business, or impose unusual and unnecessary restrictions upon lawful occupations. In other words, its determination as to what is a proper exercise of its police powers is not final or conclusive, but is subject to the supervision of the courts."

Applying the principles set forth in these cases to the authority of boards of health under this chapter to deal with estates infested by brown-tail or gypsy moths one is led to the following conclusion,—that an owner may be compelled to abate a nuisance on his own land which he did not create or invite, but only when the compulsion imposes a reasonable burden upon him and the extermination of reptiles, noxious animals or insects has never been held a reasonable burden.

It would seem to follow from one of the cases that the presence of the nests of the brown-tail or gypsy moth on land might make that land a nuisance and cause of sickness so that your boards

could take action, while the presence of the moths or caterpillars after they were able to fly or crawl would not justify such action.

Boards of health acting under the authority conferred by sections 65 to 69 of chapter 75 cannot make it a crime to have stagnant water, brown-tail moths, or any other source of sickness upon land. If such a vote was passed it would be unconstitutional, and no man could be punished or fined if the thing declared a nuisance were found on his land.

A board of health must deal with each owner separately and inquire into the state of affairs on the particular parcel of real estate they are considering. If they find a piece of real estate has nuisances, sources of filth or causes of sickness on it which can be removed without inordinate expense, they can order the owner or occupant to remove such nuisances in the exact form set out in the statutes, and if the owner does not remove them he or the occupant is fined for not obeying the order,—not for having the nuisance there, for he may not be to blame for that, but for not removing it when ordered so to do; the tests of the constitutionality of such orders being those given in Lawton v. Steele,—first, that the interests of the public generally as distinguished from those of a particular class require such interference with the rights of the individual, and, second, that the means are reasonably necessary to the accomplishment of the purpose and not unduly oppressive upon the owner or occupant.

VICE-PRESIDENT DURGIN: I have no doubt there are more questions to be asked, and valuable remarks to be made upon this subject. I think we are greatly indebted to the readers, and before we lose those who would be glad to vote with us, I call for a vote of thanks to Mr. Babson and Professor Councilman for their valuable papers.

(The motion was adopted by a rising vote.)

MR. UNDERWOOD: Mr. Chairman, I would like to say a word. Out in our district, in Belmont, we have a great many people who come to us and ask if we will not, as a board of

health, pass measures to exterminate the brown-tail moth. There have been boards of health in our neighborhood, notably, the Board of Health, of Watertown, that have passed such an ordinance. We, as a board of health, rather take the ground that Mr. Babson has stated here, that it was not always justice to pass a broad order. It does not seem to me that it is right for boards of health in towns that are situated as our town is to pass a general order compelling all people to remove the brown-tail moth pest from their trees.

In Belmont we have a good many worthy farmers who have large wood lots, who absolutely have not the money nor the time necessary to remove all the nests that there are on their places, and it does not seem right for our Board of Health to pass such an ordinance. It would mean great hardship to those men, and it would generally mean that we would lose a great many acres of wood lot, for they would have to cut the trees down because they would not have the money to care for them. I am wondering if as a board of health we could go to some people who perhaps had the means and would not clear up their property, and say: "Here, you must clear up this property. The brown-tail moth is injurious to health, and we want you to exterminate them." If we say this to a man who has the means to care for his property are we not obliged to treat every one in the same way and oblige other men who have not the money, to clear up the moths? Next year this matter is going to be agitated a great deal more, and I would like to have an opinion on it. I think another year a great many boards of health have got to face this question.

MR. BABSON: I would say that I tried to make it clear in the paper that I wrote that as boards of health have not a right to make crimes, boards of health cannot constitutionally pass a regulation making it a crime punishable by fine under those sections to have stagnant water on a man's land, or to have the brown-tail moth or any other nuisance upon his land.

What the boards of health can do is this: That if a particular man's land, by reason of stagnant water or by reason of the nests of the brown-tail moth, is a nuisance, they can inquire into that particular case, and can order that particular individual to remove that stagnant water or those nests of the moth from his land, and if he does not obey the order, then he is subject to the fines imposed by the statute.

In regard to the other question, police power, as I said, must be exercised so as not to be unduly oppressive to the individual. The court says that broadly, leaving each particular case to be decided as to whether that particular act was oppression or not. It would seem to me, in my opinion, each particular case standing on its own bottom and having to be decided upon its own merits, that if I owned a piece of pasture land or wood land, consisting, we will say, of five acres, worth $20 an acre, or $100 in all, and it would take $1000 to remove the nuisance, whatever it was, from that piece, a court would probably say that that was undue oppression towards the individual, whereas if I owned a piece of land which was worth $1000, and it would cost $100, or $500, or $600, to remove the nuisance from it, as my land, in the condition in which it was, was a menace to the health and comfort of the community, I think it might be constitutional to require me to spend $100, or $500, or $800, or perhaps even up to the value of the land, to take it off. Each case will have to be decided, in my opinion, upon its own merits, because the moment that you undertake to exercise the police power in such a way as to make it, in the opinion of the court, unduly oppressive to the particular individual whom you order to do certain things, that moment—no matter where the line is, the line will be found by the court somewhere—then it becomes unconstitutional. I should think off-hand that the extreme limit which a man constitutionally could be required to expend to get rid of a nuisance on his own land was the value of the land itself; that is, I don't know where inside of it it would fall, but I should think that that would be about the extreme limit that

you could go to. You might say that if A has something which is a nuisance and a menace to the health and comfort of society, society has a right to get rid of it; if the man has it, it should be got rid of at any cost to him. If he is unfortunate enough to have a nuisance, why, it may lead to virtual confiscation of that piece of property, but I don't think it could go any farther; I think that would be the extreme limit.

VICE-PRESIDENT DURGIN: Mr. Underwood's question, which has been so clearly answered, is the one about which nine-tenths of the confusion in the community has been caused. The question is as to whether the Board of Health can proceed with an adjudication and order, in dealing with the brown-tail moth, instead of proceeding with each case separately. The Boston Board has been publicly accused of declining to take the former unwarrantable position when called upon, and that afterwards, under pressure, it took that course. Well, we have not done anything of the sort. The board has followed to the letter the instructions given us then, and which you have been given this afternoon by good authority. As I understand it, we are to proceed in the case of the brown-tail moth just as we proceed with other nuisances, that is, to inspect and pursue each case individually, give the order upon the individual owner of premises, and, if necessary, enforce it as in any other case.

DR. HOLDEN: If I understood the speaker, he said that while it might be competent, or was competent, for boards of health to order the removal of the nests of the moths, either the brown-tail or the gypsy, they would not have a right to order the removal of caterpillars. If I understood so, I don't see the difference why there should be that difference.

MR. BABSON: The Supreme Court in this California case found a difference in this, that when animals or things were wild by nature, and were moving constantly, their momentary pres-

ence upon a man's land today, which might cease tomorrow and they be over on his neighbor's, might not be a case for the exercise of police power; whereas the fact of the existence of the nests might make the trees and bushes and the land upon which they were a nuisance. The difference found by the court was in this, that the squirrels, the ants, the moths, were able to move and fly around; if they were on the man's land today they might be on somebody else's land tomorrow, and that you could not legislate against that particular man and his particular estate because things were on it which possessed the power of motion and were moving. Whatever the distinction is, it is a distinction made by the courts rather than myself. When these creatures are flying and moving so that they are on this man's land today and spread over the next man's tomorrow, why, it might be difficult on that account to adjudge the man's land a nuisance; whereas, if he allowed things to remain there, like nests on trees, etc., the land might be a nuisance.

(Adjourned.)

VETERINARY SANITATION.

By Veranus A. Moore, M. D. Cornell University, Ithaca, N. Y.

ETIOLOGY OF HOG CHOLERA. In a recent bulletin issued by the U. S. Bureau of Annual Industry, Dorset, Bolton and McBryde have given the details of the investigations into the nature of hog cholera. They have confirmed the preliminary statement made in 1903 that the cause of hog cholera, at least of certain forms of it, is a filterable agent. The sanitary significance of this work is so great that it seems well to quote a few paragraphs from the author's conclusions.

"While our experiments established beyond question that the filterable virus was present in all the outbreaks studied experimentally by us, it is also true that *B. choleræ suis* was present almost as uniformly. So it would be impossible to overlook, even if we were inclined to do so, the part which this organism

may have played. But from the results of our inoculations with the filterable virus on the one hand, and our results and those of others with cultures, on the other, we are compelled to conclude that the prime cause in our cases was the filterable virus, and that *B. cholerœ suis* was at most an accessory factor.

"The exact role played by *B. cholerœ suis* in outbreaks of acute hog cholera is difficult to define. That the fatal result in many instances is materially influenced by the presence of that organism cannot be doubted, and, in addition, we would emphasize the fact that although the filterable virus appears to have been the primary invader, in those cases of acute hog cholera which we have studied, we do not deny the possibility of independent disease being caused by *B. cholerœ sius*. In fact, it is difficult to avoid a belief in such a possibility, on account of the very considerable pathogenic power for hogs exhibited by many cultures of that organism when fed or administered intravenously. The filterable virus seems not only to cause disease by itself, as shown by the results of many of our experiments, but it seems also to be able to lower the resisting power of the hog and thus enable *B. cholerœ suis* to invade the body, and this we believe takes place in the majority of cases in natural outbreaks. If the filterable virus is capable of lowering the resisting power of hogs for *B. cholerœ suis*, then it is easily conceivable that other agencies may also lessen the resisting power of these animals.

"So it must be admitted that a disease in hogs may exist which is due to *B. cholerœ suis*, and having no connection with the filterable virus found by us in the outbreaks we have studied. From the knowledge we have of the pathogenic powers of *B. cholerœ suis*, however, we would expect that any disease in which it is the chief pathogenic factor would be possessed of a low degree of contagiousness.

"The fact that *B. cholerœ suis* was found in a large proportion of the cultures taken from hogs inoculated with filtered serum seems to indicate strongly that that organism has its normal habitat on or in the bodies of healthy hogs, and that in the case

of lowered resistance on the part of the hogs this organism enters the circulation. A careful study of the bacterial flora of the hog's alimentary tract might throw considerable light upon this subject."

MUNICIPAL SANITATION.

Charles V. Chapin, M. D., Superintendent of Health, Providence, R. I.

CONTROL OF MEASLES. Newsholme* shows that the fatality from measles is very small after the sixth year of life. In Brighton, under one year of age, the fatality was 25 per cent., while of 270 persons of six years of age and upwards, sick with measles, not one died. He therefore considers it desirable to postpone the date of attack if possible. It is advised that cases of measles be reported by physicians and school officials, and that the well children in the family who have not had measles be excluded from school. Ordinary domestic cleansing suffices for disinfection. The most important means of lowering the mortality from this disease is to discourage school attendance for children under five years of age. Newsholme is very decided on this point, and is strongly of the opinion that the educational advantage to young children is not sufficient to compensate for the expense and attendant evils.

Dr. Niven† does not think that much can be done to restrict the spread of measles. The chief reason for this is, that the disease is exceedingly contagious for several days before it is likely to be recognized. Reports by physicians are not recommended, and he quotes Wheatley as showing that in Blackburn only about half the cases of measles are under medical supervision. Removal to the hospital and disinfection are not of much value. Most can be accomplished through the medium of school teachers. They should be instructed to recognize the initial symptoms of the disease, and exclude all affected until the nature of the illness is cleared up. Children from infected houses should be excluded. When 10 per cent. of the pupils

*Report of Medical Officers of Health, Brighton, Eng., 1904.

†Report of the Health of the City of Manchester, Eng., 1903, pp. 138-150.

in a lower grade school have been attacked, the school should be closed for three weeks. This will usually terminate the outbreak.

The placarding of measles is not common, though it is required in Michigan, New Hampshire, Ohio, and Vermont, and by the rules of several cities in other States. Among the latter, Newton was included, until 1902, when the practice was abandoned. No isolation is required, and it is claimed that 98 per cent. of the cases receive no medical attendance. ‡

While most cities are doing little to restrict measles, and some, as Newton, have abandoned former methods of control, New York (Report of the Department of Health, 1902, pp. 181 and 384), has been following a more vigorous policy. Cases were first isolated in 1896, but owing to the negligence of physicians, few reports were received. In 1902, the physicians were called to account for this neglect, many more cases were reported, and strict measures of isolation and disinfection were adopted. The figures given below (for the period since the organization of the greater city, do not indicate any markedly favorable result from the measures adopted:

MEASLES.

	Cases.	Deaths
1898	9,916	651
1899	8,577	587
1900	10,698	816
1901	7,592	449
1902	11,645	710
1903	13,689	508
1904	32,861	895

TYPHOID FEVER AND FLIES. Much has been written about the role of flies in the transmission of this disease, and doubtless they sometimes do act as carriers. Numerous observations and experiments have been made to determine that flies may transmit this disease, but little proof has been furnished

‡Report of the Board of Health Newton, 1902, p. 21 and 1903, p. 12.

that they do. Niven * compared the prevalence of flies and the prevalence of typhoid fever from July 4 to Nov. 28, 1903. The flies were caught in traps, and the maximum was reached during the week ending August 29. During the next four weeks the number of flies diminished over 90 per cent., while typhoid fever steadily increased, the maximum being reached during the week ending November 7. Niven infers that there is no evidence to show that flies are important agents in the spread of typhoid fever in England.

DIPHTHERIA AT THE WILLARD STATE HOSPITAL. Drs. William L. Russell and Thomas W. Salmon have recently issued a report † on an outbreak of diphtheria in the hospital for the insane at Willard, New York. Previous to 1897, there had only been one case of diphtheria in the institution, in 1876. In 1897 there was a somewhat limited outbreak lasting from February to July. Twenty-two months later, in June, 1899, another outbreak commenced which continued until July, 1904. This report should be most interesting reading for those health officers who think it is easy to "stamp out" diphtheria. In this institution, for a period of five years, diphtheria prevailed, although the authorities had a far more complete control of all the individuals than they could possibly have in any ordinary community. Absolute isolation and thorough disinfection were insisted on in every case. Release from isolation was permitted only after three successive negative cultures from both throat and nose. Not only were the actual patients isolated, but all persons who carried diphtheria bacilli were subjected to the same restrictions. During the outbreak there were 157 well-defined cases of diphtheria, although more than 10,000 immunizing doses of antitoxine were used. Over 450 well persons were found to be infected. During the outbreak over 100,000 cultures were taken. The number of inmates in the institution during the outbreak was 4345, of whom 3.6 were attacked.

The number of officers and employees was 1141, of whom

*Report on the Health of the City of Manchester, Eng., 1903, p. 123.

†Reprint from the Sixteenth Annual Report of the New York State Commission in Lunacy.

nearly 10 per cent. contracted diphtheria. Many interesting facts are given in regard to the morphology of the diphtheria bacilli found, and the duration of infection, and in regard to the mode of extension of the disease.

ABATEMENT OF NUISANCES. The city of St. Paul‡ has adopted a somewhat novel procedure for enforcing its orders. When a property owner fails to abate a nuisance the health department places a placard upon the premises, stating that "These premises are UNHEALTHY and should not be occupied until they are put in a sanitary condition." An ordinance provides a penalty for the removal of the notice.

Every health officer has had trouble with the dump nuisance. One of the chief factors in the production of this type of nuisance is the burning of combustible material upon the dump. Boston has recently¶ passed an order forbidding the burning "in the open air of any refuse, rubbish or waste material of any description except with a written permit from the Board of Health."

The temporary privy vaults erected by contractors are often a nuisance, and doubtless also the means of spreading infection. In the District of Columbia * no builder can set up such a privy except with the permission and under the direction of the health officer.

Sometimes boards of health are induced to adopt regulations which, however desirable in themselves, have little relation to the preservation of public health. Such a rule is that adopted in Hoboken in 1902, requiring that before a room is re-papered all the original paper must be removed. Rules of this kind are frequently a dead letter, but it is interesting to note that in Hoboken this particular rule is enforced and persons are occasionally prosecuted for its violation.†

‡Annual Report of the Commissioner of Health, 1903, p. 10.
¶Report of the Health Department, 1903, p. 48.
*Report of the Health Officer for 1902-3, p. 57.
†Report of the Board of the Board of Health for the years ending May 1, 1902 and May 1, 1904.

SANITARY NOTES.

By Robert Spurr Weston, Assoc. M. Am. Soc. C. E.

POLLUTION OF LAKE CHAMPLAIN.* This report of 119 pages was made upon the appeal of the State of Vermont to the National Government to investigate the sanitary character of Lake Champlain with regard to its future use as a source of water supply.

A careful study of the geology of the valley and the appearance of the lake was first prepared and afterwards the effects of the different pulp manufacturing plants and sewage outfalls were carefully considered. The investigations seem to have been carried on in a very able manner; each manufacturing process was carefully studied and the effects of every waste product upon the sanitary condition of the lake were worked out. The results were quite different from popular expectation. The mills do not produce wastes which can seriously affect the character of the lake water, although the waters of the streams on which the mills are located become much polluted. The waste liquors are antiseptic and therefore kill algae and sewage bacteria, though this fact is not often noticed because the dilution of the waste is usually so great.

The pollution of the lake by sewage is a much more important matter, although the pollution is local, not general. Burlington is the chief offender, discharging its sewage into a bay where the water is practically stagnant and drawing its water supply only three miles from the sewer outlet, well within its influence.

The report mentions one amusing incident in the case of a town on one of the mill streams which complained bitterly of the manufacturing waste pollution, as the stream was a desirable source of water supply. Investigations showed that the manufacturing wastes, though unsightly, were not dangerous, while the worst pollution was caused by the sewage of the town making the complaint.

*Water Supply and Irrigation Paper, No. 121, M. O. Leighton, Hydrographer.

The investigation shows conclusively the greater need for purification of municipal (sewage) rather than factory wastes.

TRAPS OR NO TRAPS. Allen Hazen.†

Mr. Hazen in a recent report on the sanitary condition of the sewers at Winnepeg, Manitoba, corrects many impressions which unfortunately are only too prevalent in many cities and towns. His investigation was caused by the fear of the citizens that the bad odors escaping through the perforated covers of the manholes of the sewers caused the recent epidemic of typhoid fever. According to the English practice, each house connection at Winnepeg is provided with an intercepting trap, precluding any ventilation of the sewer through the house drainage system. Mr. Hazen points out that infectious diseases are not spread by sewer gas and that the bad odor was due to the lack of flushing of the sewers, the low grading of the sewers made necessary by the flatness of the region, the closing of the ventilation outlets of the sewer with straw to prevent freezing, and the fact that all house drains are trapped.

Mr. Hazen recommends that flush tanks should be provided at the ends of sewers and that the use of traps be made optional, thus in course of time, as new systems are installed without traps, ventilating the sewers through the houses instead of through the manholes in the streets. In this way the bad odors would escape at the tops of the houses through the house ventilators, where they would be unobjectionable.

Great care, however, will have to be taken to prevent the closing of the ventilator outlet during the winter, when the moisture arising from the sewer readily freezes on the inside of the vent pipe. Furthermore, care must be taken to keep the plumbing in good condition, that illuminating gas and sewer gas may not get into the house through the drainage system.

Extensive investigations by Colonel Ruttan, city engineer, have shown that the condition of the house plumbing in the city has no connection with the amount of typhoid fever. Winne-

†Report on Winnipeg, Manitoba, Sewerage System. Engineering News, March 9, 1905.

peg was formerly supplied with water from the Assiniboine river. This became polluted, and ten years ago Mr. Rudolph Hering advised the adoption of an artesian well supply, the water to be softened before use. The city has grown with great rapidity and the increased consumption of water has made necessary the taking of water from the river, to which cause the prevalence of typhoid is traced.

In this connection it should be noted that Brockton, Mass., a city of nearly 50,000 people, which is sewered without the use of intercepting traps, has the lowest typhoid fever death rate of any city in Massachusetts of over 25,000 inhabitants.

STATUS OF THE SEWAGE DISPOSAL QUESTION.* This general paper on sewage disposal gives rather interesting figures, showing that not far from 73 per cent. of the population of the United States discharge sewage into inland streams and lakes, 23 per cent. into the sea, and 4 per cent. through purification works. In his classification of States, the author shows that 75 per cent. of those having the strictest laws are inland States, so that the strictness of the laws is not in every case a measure of the sanitary condition of the State. Rhode Island, classed as one of the worst of the States in this case, treats nearly as much sewage as any other State, and a larger percentage of the population contribute to this sewage than in any other State, except Massachusetts. The author mentions sewage farming as being principally adapted to the Western States. His figures of foreign practice are interesting as showing that the number of persons which an acre of land can take care of varies between 82 and 451. In both these extreme cases the acreage was about the same. In the intermittent sand filtration system from 323 to 1164 persons can be cared for by an acre.

The author points out very clearly the need for selecting the method of treatment best suited to the local conditions and not to use all the available funds in building the system, but to save some for supervising the system.

*Paper by George A. Johnson, Ohio Sanitary Bulletin, January to March, 1905.

The paper concludes with a description of the Columbus Sewage Testing Station, where the sewage of about 4000 people is received for experimental purposes. At this station contact beds, sand filters, trickling filters with and without settling tanks, and septic tanks are tried, either singly or in various combinations.

IS CHEMICAL TREATMENT OF SEWAGE GOING OUT OF USE? Looking over recent numbers of "The Surveyor," the reviewer is impressed with the fact that a good many of the English cities employing the chemical precipitation method for treating sewage are changing over to other methods. One of the latest changes at Minworth Preaves, England, where the sewage had, until 1901, been treated by chemical precipitation, followed by broad irrigation. At that date the use of lime was stopped and septic action in the settling tanks was allowed to take place. This resulted in a saving of $15,000 to $20,000 a year for lime, and a reduction of 35 per cent. in the amount of sludge without deterioration of the effluent. The additions to this system recently completed consist of septic tanks and filter beds, with aerating and filter beds. The filters are of the trickling type, the sewage being sprayed on the beds.

NEW WATER FILTERS AT PITTSBURG, PA.† One of the largest water filtration plants in the world, and next to the Torresdale plant now being built for Philadelphia, the largest in the United States, will soon be put under construction at Pittsburg, Pa. There will be large settling reservoirs, 46 1-acre covered filter beds, covered clear water reservoirs, large conduits and pumping stations. The arrangement of piping is especially noteworthy, and the plans provide for a central administration building, with laboratories and apparatus for the ventilation of filters and filter galleries when needed. Alternative proposals are invited on scraping the filters and replacing the washed sand by machine and hand.

†Engineering News, Feb. 16, 1905, p. 173.

SANITATION OF CONTRACTORS' CAMPS. From a sanitary standpoint the most notable of the requirements of the contract relates to the sanitation of the contractor's camp and the health of the workmen. Laborers' quarters must give at least 300 cubic feet of air space per sleeper, must have tight floors at least one foot above the ground. Each camp must have a separate building for a wash-house or laundry, and another for a kitchen or cook-house. Stables must be distant at least 150 feet from the buildings. The workmen must have pure water. Water-closets must be provided and the waste must be treated in tight septic tanks, the effluent from which must be "reasonably clear, colorless, free from disagreeable odor and entirely unobjectionable to run out to a water course." Medical supervision of the workmen is also required. These provisions should reduce to a minimum the danger of a typhoid epidemic, something that is greatly feared by cities undertaking the construction of large reservoirs.

BERLIN AND PARIS SEWAGE FARMS.‡ The following statistical table states in brief the conditions at the Berlin and Paris sewage farms, respectively:

	BERLIN.	PARIS.
Population by last census	2,714,068	1,656,040
Water Supply, gals. per capita per diem	32	21
Unfiltered water supply, not used for domestic purposes	62	——
Total water supply, gals. per diem per capita	94	21
Area actually under irrigation, acres	13,100	17,500
Average quantity of sewage applied, gals. per acre daily	12,300	3,530
Number of persons sewered per acre	207	113

"At Paris the cost of pumping and distributing the sewage, not including interest and sinking fund charges, is $11.30 per

‡Allen Hazen, Engineering News, March 16, 1905, p. 285.

million gallons. At Berlin the cost of pumping is about $9 per million gallons and the income from the farms somewhat exceeds the cost of operating them." Small profits have been made at the Berlin farms ever since 1885.

SMALLPOX INFECTION BY AIR CURRENTS.¶ In a recent report made to the Local Government Board, Dr. G. S. Buchanan points out the danger of infection by air currents. His investigation was made in connection with the recent epidemics of smallpox at Gateshead and Felling. The Sheriff's Hill Hospital received all the cases within twelve hours after infection. The houses, bedding, etc., were systematically disinfected. The disease seemed to spread from the hospital in the direction of the prevailing winds, and the number of cases was much greater nearer the hospital, though the outer districts were more in communication with the hospital. The effect seemed to be felt with moderate winds for a distance of about half a mile.

TYPHOID FEVER AT LINCOLN, ENGLAND.* In the last number of this journal there appeared an editorial, entitled "Filtration versus Pseudo-Filtration," in support of which is the following example:

Lincoln is a flourishing manufacturing center with a population of about 50,000. Up to April 1, 1904, nearly 900 cases of typhoid had been reported, with about 100 deaths. The municipal water works derives its supply from ponds on the outskirts of the city and from the River Witham, a badly polluted stream, which flows through it. The city authorities have been repeatedly warned of the danger of this latter supply, but the health of the town would have been safe, notwithstanding, but for the fact that the filters became frozen, imperfectly purifying the water, and naturally there resulted the epidemic above described.

¶The Surveyor, January 13, 1905.
*The Surveyor, February 24, 1905.

CANADIAN NOTES.

By John A. Amyot, M. D., Provincial Board of Health of Ontario.

The introduction of a Ministry of Public Health is being seriously discussed in Ontario. It is proposed that this minister have under his control, Immigration, Labor and General Public Health. Under Immigration, he will see that only desirable immigrants as to health and morals enter the Province. Under Labor, he will look after proper hygiene and accommodation in factories, lumber camps, construction camps, and, of course, labor questions proper. Under General Public Health, the enforcement of the Public Health Act, the regulation and inspection of hospitals, asylums and poor-houses.

The new Ontario Cabinet, out of nine members, has three medical men.

Mr. E. C. Whitney of Ottawa has donated $15,000 to be a nucleus for the foundation of a fund towards the establishment of a residence for male students in the Provincial University at Toronto.

The Canadian Anti-Consumption League have been holding a series of meetings at Ottawa. Their chief aim is to combat tuberculosis by the sanitorium method. A petition which has been sympathetically received has been presented to the Dominion Government, asking that model sanatoria be established, one in each Province, to be an object lesson. The Government has been asked, and will probably appoint a Royal Commission to study the tuberculosis problem in Canada.

A pure food society has asked the Legislature to rule that bread must be delivered, each loaf in a paper bag.

There is a project on hand to establish a first-class University Hospital in Toronto. This hospital is to cost $1,000,000, and to be thoroughly equipped.

POLLUTE A WATERCOURSE. Donovan *v.* Township of Lochiel.—Judgment (E.B.B.) in action tried without a jury at

Cornwall. Action for damages for the pollution of a watercourse by means of a ditch which carries the refuse from a cheese factory into the watercourse, and for an injunction. The learned judge finds defendants liable for the nuisance, and assesses plaintiff's damages at $200, and orders that defendants be restrained from permitting any injurious matter to escape from the highway to plaintiff's land and from permitting or causing to flow upon plaintiff's land by way of the ditch or otherwise from the highway any water or other liquid or solid matter which would not naturally have reached it. Defendants to pay plaintiff's costs. D. B. Maclennan, K.C., for plaintiff. J. Leitch, K.C., for defendants.

THERAPEUTICS.

By H. D. Pease, M. D., Director State Antitoxin Laboratory, Auburn, N. Y.

DIPHTHERIA ANTITOXINE IN CEREBRO-SPINAL MENINGITIS. At a meeting of the Medical Association of the Greater City of New York, April 10, 1905, Dr. Wolf of Hartford, who was the originator of the use of diphtheria antitoxine in cerebro-spinal meningitis, read a paper giving his reasons for first undertaking this treatment. Without repeating his arguments it may be said that they did not find any acceptance by those who discussed the paper, including Drs. W. H. Park, James Ewing, E. Libmann, and others. The writer, who was present, agrees strongly with the general trend of the opinions expressed during the discussion. There was also a practically complete unanimity of opinion in the discussion that the injections of diphtheria antitoxine had brought about no material change in the course of the disease in the cases coming under the observation of those speaking on the subject.

ANTISTREPTOCOCCIC SERUM. Bumm‡ gives a summary of his experience with the antistreptococcic sera of various European producers, in different classes of known and suspected streptococcus infections. He used large doses up to 1000 cubic

centimetres. In five cases of puerperal septic peritonitis he obtained no beneficial results. Of three cases of operation peritonitis, two showed no effect from the serum, and one improved rapidly after three daily injections. In two cases of septicaemia with endocarditis, the results were negative, as was also the case in four cases of pyaemia. In fifty-two cases of streptococcus infection of the endometrium, of which 32 were mild in character, five died and 21 were benefited. On the whole, the serum was seldom of benefit in the cases of generalized infections, but was more frequently beneficial in cases of localized disturbances.

Peham * reports upon the use of Paltauf's antistreptococcic serum in 44 cases of streptococcus infection, which he divides into six groups: Of 19 cases of pure streptococcus infections, 1 died; of 14 cases of mixed streptococcus and some other infections, 6 died; of 2 cases in which no bacteriological examination was made, 1 died; of 3 cases in which the bacteriological examination was negative, none died; of 3 cases in which the bacteriological examination was doubtful, 2 died; of 3 cases in which there were serious complications, 3 died. The serum was administered in doses of 100 c. c. The author states that if the injections are not given early in the disease they are useless.

ANTIPNEUMOCOCCIC SERUM. Passler † reports the use of Romer's antipneumococcic serum in 23 cases of pneumonia. The size of the dose varied in size from 10 to 30 c. c., and in number up to four in each case. There were four deaths and 19 recoveries in the series. Of the four fatal cases three were moribund when injected. In ten of the recoveries the crisis occurred after either the first or second injection. In six of the cases the injections had no effect on the temperature.

Anders ‡ has published a critical summary of the literature on the use of antipneumococcic serum in 535 cases of lobar pneumonia with an average mortality of 18.3 per cent. The author states that the results do not carry conviction as to the usefulness of the remedy.

ANTIDYSENTERIC SERUM. Kanel¶ results obtained from the treatment of 130 cases of acute dysentery, chiefly adults, treated at Moscow in the summer of 1904. Of these 21 cases were mild in character. In eleven instances bacteriological examination showed the presence of the dysentery bacillus in the stools. At first he used doses of 20 c. c., but later doses two or three times that size were administered. The mortality was 3 per cent., and if moribund cases are eliminated it was 2 1-3 per cent. According to the author, the serum injections did not appear to influence the temperature, but had a marked effect on the number and character of the stools. The duration of the disease was shortened.

ANTI-ANTHRAX SERUM.* Legge has recently published a critical summary of the work of Sclavo, and those who use the latter's method of preparing anthrax immune serum. Legge states that Sclavo and Soberheim have produced an effective serum by the injection of sheep and asses with cultures of anthrax bacilli while at the same time, or previously, the animals received anthrax immune serum intravenously. According to these workers, this serum acts effectively as a prophylactic agent in cattle and in man. In 164 cases of external anthrax in man treated with Sclavo's serum the mortality was about 8 per cent. as compared with 24 per cent. for all cases occurring in Italy at the same time. Legge says the serum is harmless given intravenously, even in large doses of from 30 to 40 c. c., or larger. The editor of this section, after reviewing the recent literature on the subject of the therapeutic value of antistreptococcic, antipneumococcic, antidysenteric and antityphoid sera, feels but little hesitancy in stating his opinion that in no one of these diseases has there yet been demonstrated an entirely satisfactory serum therapy. Further scientific observations in the subjects of immunity and the differentiation of bacteria will be required before any great improvement can be expected.

THE INTRAVENOUS INJECTION OF ANTITOXINE DIPHTHERIA. Biernacki and Muir† treated 45 cases of diphtheria by intravenous injections of diphtheria antitoxine. They divided the cases into two groups of seven, and 38 cases respectively. The first group was virtually selected from a service of 334 cases of diphtheria. From the histories given one is led to conclude that they were all of a very severe type. Five cases ended fatally. The doses used varied from 12,000 to 40,000 units, and in two instances at least general anaesthesia was employed. In three instances a chill and rise in temperature followed. In the second group of 38 cases the disease was also severe, but there were but three deaths. While the authors conclude that it was difficult to say of any individual patient that a better result was obtained than might have followed subcutaneous injection, they admit that the total result in group two is a good one. The impression one gains from reading the article is one of the questions as to the influence which the methods of producing anaesthesia exerted upon the final termination of some at least of the cases. In one fatal case in group two the authors state that the anaesthetic was badly taken. The rigor and chill following three cases in group one would also indicate a possibly bad influence of general anaesthesia. The question might well be raised whether general anaesthesia is at all necessary for such a minor operation as the intravenous injection of 50 cubic centimetres or less of serum.

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THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston, March, 1890, *with the following objects; The advancement of sanitary science; the promotion of better organization and co-operation among local boards of health, and the uniform enforcement of sanitary laws and regulations*

THE JOURNAL OF THIS ASSOCIATION has for fifteen years faithfully reflected the views of the public hygienists of Massachusetts. With the November issue of the year 1904, *the encouragement received from many hygienic quarters induced the Association to undertake the expansion of the Journal to a national standard, with the co-operation of many noted sanitarians as editors. A new title was selected, while the older and well-established title was retained also.*

The dates of publication are FEBRUARY, MAY, AUGUST *and* NOVEMBER *of each year.*

THE JOURNAL will contain the papers read at the meetings of the Association, papers contributed by hygienists, reports of the discussions, editorials, abstracts, reviews and hygienic notes of professional interest. Subscription rates, $1.00 *per year. Reprints furnished at cost price.*

All communications concerning the JOURNAL, copy, proof, subscriptions, advertisements, etc., should be addressed to the Managing Editor, DR. H. W. HILL, 739 *BOYLSTON ST., BOSTON, MASS.*

All communications concerning the ASSOCIATION should be addressed to the Secretary of the Association, JAMES C. COFFEY CITY HALL, WORCESTER, MASS.

All bills not relating to the Journal, and MEMBERSHIP DUES ($2.00 *per year), should be sent to the Treasurer of the Association, DR. JAMES B. FIELD,* 329 *WESTFORD ST., LOWELL, MASS.*

EDITORIALS.

THE COMING MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

The American Public Health Association is to meet in Boston, September 25-29 of this year. The Laboratory section meets September 25; the main association, September 26-29. Dr. H. P. Walcott, president of the Massachusetts State Board of Health, and of the Massachusetts Association of Boards of Health, is chairman of the local committee of arrangements. Membership in the association is open to all interested in public health matters; but the association is largely made up of public health officials, Federal, State, Provincial and Municipal, from the various parts of the United States, Canada, Mexico and Cuba. The association is international in scope, and is the oldest, largest and most influential hygienic association in the Western Hemisphere. Its list of ex-presidents is practically a list of the most prominent official hygienists of the four countries since 1872. New England has contributed its quota of presidents, Drs. H. P. Walcott and S. H. Durgin of Massachusetts, Dr. Henry D. Holton of Vermont, and Dr. C. A. Lindsley of Connecticut. Nothing related to public health is foreign to the discussions of the association, and its thirty-three annual volumes of transactions contain an immense amount of valuable material.

The Laboratory section of the association, which has been prominent in the last few meetings, was designed to provide a rendezvous for the reading and discussion of the technical papers relating to the laboratory work which has become so important an item in modern public hygiene. To this section papers of all kinds dealing with chemical and bacteriological matters have been contributed; covering the subjects of diagnosis, technique, analysis of foods, water, sewage, disinfectants, milk, antitoxins,

mallein, etc., etc. The section has taken up the work of establishing uniformity of methods for such work. The work of the committee on standard methods for water analysis is the most complete and authoritative of those so far attempted, and has met with wide scientific approval here and abroad. A committee on standard methods for diagnostic work now exists, and will devote itself to doing for this branch of hygienic work what the water analysis committee has already done for its subject.

The officers of the Association for the Boston meeting are: President F. F. Wesbrook of the University of Minnesota, and the Minnesota State Board of Health, an honorary member also of the Massachusetts Association of Boards of Health. The vice-presidents are: Dr. Juan Guiteras, Havana, Cuba; Dr. Fernando Lopez, Mexico, and Dr. John A. MacDonald, Brandon, Manitoba. The secretary is Dr. Charles O. Probst, of the Ohio State Board of Health, and the treasurer, Dr. Frank W. Wright, of the New Haven (Conn.) Board of Health.

The Chairman of the Laboratory Section is Dr. W. H. Park, Bacteriologist to the New York City Board of Health; the vice-chairman is H. W. Clark, Director of the Water Laboratory of the Massachusetts State Board of Health. The secretary is Dr. John S. Fulton, secretary of the Maryland State Board of Health, and the recorder is Dr. H. D. Pease, director of the New York State Antitoxin Laboratory, Albany, N. Y. Many of these gentlemen are already familiar to the readers of this Journal as contributors to its columns.

The coming meeting is especially of interest to public health officials because of the special attention which will be paid to the discussion of methods of training health officials, the institution of a degree for those engaged in such work and the advancement of public hygiene along systematic scientific lines to a greater extent than ever before, ensuring a closer co-operation between executive and scientific public health workers. The University of Toronto and the University of Pennsylvania have already organized courses for medical health officers. Harvard is

about to engage on similar lines. The Massachusetts Institute of Technology has for some years provided special courses for sanitary engineers. It is generally hoped that the Boston meeting will inaugurate new ideals and new systems of work in public hygiene, which will help to carry into practice the ideas evolved by the Association and its leading members during the 33 successful and faithful years of its existence.

The program, consisting wholly of original papers and discussions on executive and technical public hygiene, promises to be of the greatest interest. The readers of this Journal are strongly urged to attend the meetings of this Association, the times and places of which will be duly set forth in the daily papers.

REPORTING OF OPHTHALMIA.

The Legislature of Massachusetts has recently provided by statute for the reporting of all cases which simulate Gonorrheal Ophthalmia in new-born children, with the object of placing upon Boards of Health the work of preventing some part of the blindness so prevalent as an aftermath of this disease. The law differs from that relating to other infectious diseases in that it does not require a report from the physician after he has made a diagnosis, but describes certain specific symptoms, and demands that the presence of these symptoms shall be reported. This peculiarity of the statute widens its application to a point where the responsibility of diagnosis and treatment are placed directly upon the Board of Health. So far as the writer is aware, this is the first legislation of this kind in Massachusetts. In the other infectious diseases the Board of Health, in the effort to meet the requirements of modern public hygiene, offers facilities for diagnosis and isolation, where these are not provided already, but in this case it seems to have been the object of the act to make diagnosis and treatment a specific statutory duty.

In accordance with the spirit of the statute, the Boston Board

of Health has directed that the following circular be sent to all physicians in Boston, and that the Boston Board of Health Laboratory should make immediate provision for the examination of material for diagnosis from the eyes of the suspected patients, with the object of determining the presence or absence of the gonorrheal organism. We append here a copy of the circular to physicians and of the directions which go with the outfit devised for the bacteriological examination of the eye.:

HEALTH DEPARTMENT.

OLD COURT HOUSE.

BOSTON, July 15, 1905.

The attention of physicians and nurses is respectfully called to the following sections of chapter 251, as *amended* by Acts of 1905:

Section 49. A householder who knows that a person in his family or house is sick of smallpox, diphtheria, scarlet fever or any other infectious or contagious disease dangerous to the public health shall forthwith give notice thereof to the Board of Health of the city or town in which he dwells. Upon the death, recovery or removal of such person, the householder shall disinfect to the satisfaction of the Board such rooms of his house and articles therein as, in the opinion of the Board, have been exposed to infection or contagion. Should one or both eyes of an infant become inflamed, swollen and red, and show an unnatural discharge at any time within two weeks after its birth, it shall be the duty of the nurse, relative or other attendant having charge of such infant to report in writing within six hours thereafter, to the Board of Health of the city or town in which the parents of the infant reside, the fact that such inflammation, swelling and redness of the eyes and unnatural discharge exist. On

receipt of such report, or of notice of the same symptoms given by a physician as provided by the following section, the Board of Health shall take such immediate action as it may deem necessary in order that blindness may be prevented. Whoever violates the provisions of this section shall be punished by a fine of not more than one hundred dollars.

Sect. 50. If a physician knows that a person whom he is called to visit is infected with smallpox, diphtheria, scarlet fever or any other disease dangerous to the public health, or if one or both eyes of an infant whom or whose mother he is called to visit become inflamed, swollen and red, and show an unnatural discharge within two weeks after the birth of such infant, he shall immediately give notice thereof in writing over his own signature to the Selectmen or Board of Health of the town; and if he refuses or neglects to give such notice, he shall forfeit not less than fifty nor more than two hundred dollars for each offence.

[*Approved March 31, 1905.*

Outfits for taking cultures from the eyes will be found at all of the culture stations, and further information may be obtained from the Board of Health, or the laboratory at 739 Boylston Street.

By direction of the Board of Health,
C. E. Davis, Jr., *Secretary.*

GONORRHEAL OPHTHALMIA. — DIRECTIONS FOR MAKING SMEARS.

This outfit contains two glass slides, two sterilized wire loops, in envelopes; a card to be filled out by the physician and these directions:

(1) Use a separate outfit for each patient, and a separate wire loop for each eye of each patient to avoid chance of infection from eye to eye.

(2) The fingers of the operator should be carefully disinfected.

(3) Place a small drop of water on one of the slides at the end away from the label.

(4) Draw down the lower lid of one eye and insert a loop (first bending it to a convenient angle) flatwise between the lid and eyeball.

(5) Pass the loop sidewise along the inner surface of the lid to secure a drop of any matter which may be present.

(6) Rinse the loop in the drop of water and spread the drop out thin. Sometimes more material may be found on inspection under the upper lid. A similar operation to the above will secure this also.

(7) Return the used loop to the envelope from which it came.

(8) Disinfect the fingers carefully, then use the second, and as yet uninfected, loop, to prepare smears as above from the second eye. Return the second loop to its own envelope.

(9) Write the patient's name and the eye examined (right or left) on the slide label.

(10) Allow the smears to dry; gentle heat may be applied to hasten the process. When thoroughly dry, place the slides together, back to back, and repack them in the slide box. Fill out the card and replace card, slides and small envelopes in the large envelope, which may then be mailed to the laboratory.

JULY QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The quarterly meeting of the Massachusetts Association of Boards of Health was held at Gallup's Island, Boston Harbor, on Thursday, July 27, 1905, by the courtesy of the Boston Board of Health. The First Vice-President, Dr. Samuel H. Durgin, presided in the absence of the President, Dr. H. P. Walcott.

The records of the April meeting, which was held at the Brunswick Hotel, Boston, were read and approved.

The following members were elected, a single ballot being cast for them on motion of Dr. Denny after the Executive Committee had endorsed their applications:

Dr. E. Alden Dyer, Whitman.
Dr. William D. McFee, City Physician, Haverhill.
W. O. Johnson, Clinton.
F. W. Taylor, Cambridge.
Dr. Rufus H. Hall, Everett.
George C. Bunker, Bacteriologist with D. Whiting & Son.
Dr. William F. Donahue, North Cambridge.
Dr. Albert P. Norris, Milk Inspector, Cambridge.
Dr. William C. Hanson, Cambridge.
Dr. T. B. Alexander, Scituate Harbor.
Dr. Joseph Frame, Rockland.
Judge George W. Kelley, Rockland.
Gurdon W. Gordon, Springfield.
Dr. T. F. Reardon, Springfield.
F. B. Allen, Springfield.
Almon Jones, Springfield.
H. W. Mason, Springfield.
A. C. Atchinson, Springfield.
H. A. Cook, Springfield.
H. J. Tait, Springfield.
Dr. Daniel C. Rose, City Physician, Stoughton.
Dr. John Shanahan, Peabody.

THE VICE-PRESIDENT: Dr. Hill has something to say concerning the Journal.

DR. HILL: Gentlemen—Under the present Journal contract, which calls for a subscription of 75 cents per head from members of this Association (the price for non-members remaining $1.00, as usual), the members' subscriptions being included in the Association fee of $2.00, the Journal has become solvent, and I see no reason why it should not remain so. Our income, conservatively estimated, from the three sources of members' subscriptions, outside subscriptions and advertisements, does now and ought to continue to exceed the expenses of publication by about

$100 a year. This or any other surplus, under the terms of the contract, is to be returned to the Association; the contract specifically providing that no one concerned in the management of the Journal but the Association itself shall secure any financial profit from it. The reason why there is not at this moment a surplus of about $100 ready to be turned into the Association treasury is that this surplus was used to make good a deficit under the previous contract. Since, under the previous contract, the Association might have been called upon to make good this deficit, the Association has lost nothing to date—indeed, it has gained the interest on about $100 for a year.

I wish to ask for instruction from the Association as to the disposal of 600-800 copies of an exhaustive index of the first twelve volumes of the Journal. This index was prepared by Dr. S. W. Abbott, with his usual care and detail, constituting almost the last of his contributions to the successful conduct of this Association and its Journal. The final disposition of these has never been passed upon by the Association, and, while I have acted as their custodian, I have never had authority to do anything with them.

DR. CHASE: Apropos of the Journal, I would like to say that I think it would be an excellent thing if some one in each of the cities and towns represented here should recommend to his Public Library for the table of the reading room a copy of our Journal, now called the American Journal of Public Hygiene. A few days ago I made the recommendation to our trustees in Brookline that they subscribe to it. It costs only $1 a year, and it is now of such a nature that it will be appreciated by almost every person of intelligence who takes it up.

THE VICE-PRESIDENT: It might be well, it seems to the Chair, to relieve Dr. Hill of the custody of these volumes by turning them over to the Secretary of the Association, and then the Secretary may be called upon at any time by members who want copies. If there be no objection, I will recommend that the copies be turned over to the Secretary, who will hold them for any call by members of the Association.

Are there any resolutions or any other business to come before the meeting.

DR. CHASE: Mr. Chairman, a great many years we have been regularly invited to this place for the July meeting, through the courtesy of the Board of Health of Boston, and we have not always remembered to thank them for their courtesy. I make a motion that we tender the City Government of Boston and the Board of Health of Boston a vote of thanks for their courtesy, for their entertainment today and the trip down the harbor.

THE VICE-PRESIDENT: The question is asked where the American Public Health Association meeting is to be held in September. We have not been able yet to select the hall, but the meeting will be held in Boston, in the best accommodations that we can find. There will be an announcement given, and that will be published in the newspapers at the time.

We are very fortunate today in having a man with us who knows all about one of the greatest pests in Massachusetts, and who will have charge of the work to be done during the next few years in the destruction of the brown tail and gypsy moth in this State. I have great pleasure in introducing to you Mr. Kirkland.

MR. KIRKLAND: Mr. Chairman, Members of the Association, I wish that I really did know all about this pest proposition, as your Chairman has so kindly said, because then I would know how the State is coming out two or three years from now in the matter, and how much help and co-operation we are to have from the people. But I assume that we are coming out all right, and I feel sure of co-operation all along the line.

THE MOTH PESTS AS PUBLIC NUISANCES.

By A. H. Kirkland, State Superintendent of the Work against the Moths.

The occurrence of the brown tail and gypsy moths in overwhelming numbers in certain sections of Eastern Massachusetts has added two new public nuisances to the burdens already

borne by our communities. While obnoxious and injurious in the highest degree for several years past, they have but recently been given legal standing as public nuisances. This was accomplished by Chapter 381, Acts of 1905, wherein special legislation looking to their suppression has been enacted. The subject is a timely, one might almost say a burning, one, and in the short time at my disposal I hope to cover the essential features of the working of the new law as applied to these pests.

THE BROWN TAIL MOTH.—The eggs of this insect are laid during the latter half of July, particularly on the foliage of fruit trees and to some extent on shade trees. When the eggs hatch, the small caterpillars immediately commence to feed and also to form their winter webs, weaving them out of silk with the remains of leaves previously fed on. By the time cold weather arrives, these webs—conspicuous objects at the tops of trees—are from two to six inches long and contain about 250 caterpillars each. In April the webs are vacated by their inmates, the caterpillars feeding first upon the buds and later upon the foliage. As they approach maturity, they acquire the wandering habit, although it is often the case that a complete defoliation of a number of trees forces a wholesale migration of the insects. At this time human beings are often poisoned by coming in contact with the caterpillars. By the last of June, cocoons are spun in foliage at the ends of branches, under fences, etc., from which the white, brown-tailed moths emerge about July 12. This in brief is the life history of the pest. The injury to fruit and shade trees by the caterpillars is a matter of common knowledge, but this, of course, is hardly to be compared with the intense burning or nettling caused whenever the caterpillars come in contact with human flesh. So far as our studies have gone, this irritation or Dermatitis seems to be the result of the mechanical irritation following upon the penetration of the brittle, finely barbed hairs into the lower layers of the skin. Further studies on this point, however, should be made. The use of cooling lotions seems to be the best remedy.

THE GYPSY MOTH differs somewhat in its life history, in that the eggs are laid on tree trunks, rocks, fences, etc., instead of upon the foliage. The caterpillars hatch the following spring, when they proceed to feed upon all kinds of fruit and shade trees, the foliage of which they devour with the greatest rapidity. Injury from the gypsy moth is principally confined to the defoliation of trees, although numerous cases have occurred where the caterpillar swarms have invaded houses and made themselves a nuisance generally. When the caterpillars are fully grown, they change to pupæ, usually on the bark of trees, under fences, etc., and by the latter part of July the brown males and white females emerge.

The differences between the two species worthy of emphasis. The brown tail moth eggs are laid on foliage; the gypsy moth eggs on tree trunks. The brown tail eggs hatch in the fall and the caterpillars hibernate half-grown in a winter web; the gypsy eggs do not hatch until spring. The brown tail caterpillars are the cause of the painful nettling so common during an outbreak of this insect; the gypsy moth caterpillars do not cause any nettling worthy of mention.

REMEDIES.—For the brown tail moth, cut off the webs during the winter and burn them. This may be done by using pole shears, and where thoroughly executed will give immunity from the caterpillar plague the following season. For the gypsy moth, search out the egg clusters and soak them with crude coal-tar creosote any time during fall, winter or spring. Both kinds of caterpillars are easily destroyed by spraying the foliage with arsenical poisons, and the gypsy moth caterpillars, when half grown, assemble in large numbers beneath burlap bands placed around tree trunks.

DISTRIBUTION.—The distribution of the brown tail moth has greatly increased in recent years because the moths fly freely and are often borne long distances by the wind. The moth is known to occur from Cape Cod northwestwardly to Amherst

and easterly as far as Eastport, Maine. Its region of most severe injury in this State will be contained within a radius of twenty miles from Boston. The gypsy moth occurs from Randolph on the south to Framingham, thence to Andover and Salisbury. The region of principal gypsy moth injury is found within twenty miles of Boston on the northern side. No serious injury is yet developed south of Boston.

By the new law against these pests, they have been declared public nuisances and their suppression is required. This work may be done either by a board or official of a city or town. Each municipality is required to make an appropriation for the work, based, within certain limits, on its valuation. When the work of suppressing the moth has been done to the satisfaction and under the direction of the State Superintendent, each municipality is reimbursed a certain percentage of its expenditure. The municipality is made responsible for the enforcement of that section of the law which requires private owners to destroy the moth pest on their property. The owner's liability is limited to one-half of 1 per cent of his valuation, an amount usually sufficient to free an ordinary estate from the pests. Suitable penalties are provided for refusing to comply with the terms of the law or obstructing properly authorized agents in their attempt to carry out its provisions.

Such in brief is the situation as we find it today with reference to systematic work against these pests. The task before us is a gigantic one, but, if the hearty co-operation of all city and town officials and all good citizens can be had, the matter can in time be brought to a successful termination. Without such co-operation little can be accomplished.

DR. COGSWELL: I should like to ask in what stage of the insect parasites are supposed to prey upon it. In the caterpillar stage or the moth stage?

MR. KIRKLAND: There are probably no insect parasites that attack the winged moth. The principal parasites work on the caterpillar and on the pupæ. Then, in the case of the brown tail moth, we find there are a lot of European parasites in the winter

nests, insects that get in there and propagate, principally in the late fall and early in the spring.

PROF. THEOBALD SMITH: I would like to ask Mr. Kirkland why these two moths differ so from the myriads of other moths that abound, and why they should multiply so and be so destructive. Is there any difference betweeen our locality and the localities in other countries where the moths also exist? Can he explain this remarkable multiplication of these insects in this locality?

MR. KIRKLAND: Mr. Chairman, it is the old story of disturbing the balance of nature. These pests, the gypsy moth and brown tail moth, in their native region, which practically amounts to the temperate zone of Europe, are held in check by, say, sixty insect parasites, three or four fungous diseases, about forty or fifty birds, and about a dozen beetles. Nature has provided all those checks on them at home. Over there occasional outbreaks occur, which run three or four years; then subside. They are comparable to the canker worm outbreaks we have here. The moths were brought here with all those checks left behind, and our native birds, and our native parasites, and our native fungous diseases, have not adapted themselves in this brief period to preying on the gypsy moth or the brown tail moth. It is practically the same story as with the English sparrow. The sparrow was brought over here, without its natural checks, and has become a tremendous nuisance. We hope by importing parasites to restore this balance of nature, as we say, so that we shall have the European enemies of the moth here, and when the moth gets to be over-abundant the parasites will have a wealth of food to which they are adapted by nature structurally; they will prey on the caterpillars, sting them, feed on them, and the next year we shall have a big army of parasites and a very few moths. Then the balance will shift. That is what we are hoping for, and that is the reason why the moth is so much more injurious here than at home; simply because it was imported without its natural enemies.

THE VICE-PRESIDENT: We are also fortunate in the discussion of the subject. Shall we hear from Professor Smith?

PROF. THEOBALD SMITH: I think our Chairman has the faculty of seizing the psychological moment in great problems of the day, and bringing them up for discussion at these meetings; but I regret to say that in calling upon me he has chosen one who knows nothing about the subject, and who simply came here to learn. I think, however, that there are certain general lessons that we can draw from this very interesting phenomenon that Eastern Massachusetts is passing through at the present time.

There is a marked similarity between the multiplication of these insects and the infectious diseases. This phenomenon, I think, can be very thoroughly apreciated by health officers, who are daily, throughout the year, fighting invisible enemies in the shape of the micro organisms which destroy human liyes. I think that bringing up such a question in an assembly such as this is especially fruitful, because those who are concerned with the public health know that it is necessary to fight these enemies with every weapon in their control, to fight them, as it were, with their own hands, and not to depend too much upon agencies which have as yet been untried, such as the parasites which are now being collected in different parts of the world to be sent over here. The work of destroying these insects is one which has to be carried on largely by individual and co-operative effort, and wherever these organisms are found they should be destroyed. It would be very unwise, it seems to me, from all that we know of the laws of parasitism, to depend too much upon the destruction of these enemies simply by parasites. I think the laws of parasitism tell us this, that no parasite ever completely destroys its host, because that would be killing the goose that lays the golden egg. Parasitism only goes to a certain point The parasite does not destroy its host, but simply troubles him and disturbs him. As Mr. Kirkland has said, if a large number of these parasites were introduced and could be made to develop under our conditions, these pests would be kept down, but they probably would not be wholly destroyed, because if

they were the parasite would have nothing to feed upon. We must always remember that the host is the home of the parasite.

It seems to me that for this reason we all are interested in the destruction of these pests. They have, of course, only an indirect bearing upon the public health. The irritative inflammation which they produce cannot be considered a very serious matter from a public health standpoint, and perhaps needs hardly to be considered, but the whole matter is one of great interest, because animal life in all its forms is coming to represent more and more to us as health officers. I need only speak of two insects that have within ten years come to the foreground on account of their relation to the public health.

Ten years ago it would have been considered absurd for anyone to stand here and say that the mosquito had anything to do with malaria. Even nine years ago, perhaps even eight years ago, the malarial parasite was regarded as living in the soil, and whenever the soil was turned over it was supposed to be set free in the air and become disseminated. During these eight years tremendous changes have taken place in our conception of certain diseases caused by insects, and today nobody would think of looking in upturned soil for the parasite of malaria. It was always an absurd proposition on the face of it, but it held its sway for a great many years. Now we know that the malarial parasite is carried by infected individuals, and that it is transmitted by insects, and this has given great impulse, not only to the study of this insect, but it has aroused interest in the whole subject of entomology among students of disease.

Another insect that is receiving more attention today from a public health standpoint is the common house fly. It breeds preferably in horse manure, and we know that flies are attracted by all sorts of decomposing material. In working in the laboratory with cultures which have a certain offensive odor, it is almost impossible to keep the flies away. They seem to be practically intoxicated by the odor of decomposition. Now, we know that flies will consume all sorts of material. They will consume sputa

very rapidly. They will consume all preparations in the laboratory that we may make, unless we watch them very carefully. The tubercle bacilli will pass through their intestines and come out largely unharmed. Typhoid bacilli are also now regarded as being carried by the fly in some epidemics.

At the present time, therefore, these two insects we guard against, or should guard against, in our public health work. We should see that flies do not come in contact with our food supply and thus disseminate the germs of infectious diseases. As I said a moment ago, ten years ago entomology had no standing in public health or in pathology, but today it has, and the interesting paper which we have heard today is another indication of the importance which entomology bears to the well being of humanity.

THE VICE-PRESIDENT: We are also fortunate in the presence of another expert. Shall we hear from Mr. Underwood?

MR. UNDERWOOD: Mr. Chairman and Gentlemen, I have listened with a great deal of interest and much profit to what Mr. Kirkland has had to say about these insect pests. In Belmont, where I live, the brown tails and gypsies have been residents for some time, and I can not help being somewhat concerned regarding this question, especially as I have about two hundred trees upon my place, in which the brown tails and gypsies are quite interested. It almost seems this summer that they have taken much more interest in them than I have. In looking into this subject and in trying to keep the foliage on my trees, I was struck by one particular thing—I was struck in the neck, so to speak—whenever I went near a tree where there were any brown tail moths I was struck with this itching brown tail rash. We have been told, and Mr. Kirkland has said today, that in his opinion he did not think that the moth had very much to do with this rash; that it was caused only by the hairs of the caterpillars. I think that in my case the moth had a good deal to do with the itch, and I can perhaps prove to you that the female moth has a good deal to do with it. Of course the caterpillars do cause the itch, we all know that; but with me, at least, I get a very

much more severe irritation from the hairs of the female moth. Let me tell you my experience.

I had always regarded that the moths had nothing whatever to do with the rash, but during the flight this July, that Mr. Kirkland has told you of, when they were flying about the electric lights, I went out in the evening to collect some of them. I was standing under one of the lights when, with a thump and a buzz, a moth went down under my collar. I immediately pulled it out, and found that it was a female, with the characteristic tuft of brown hairs on its tail. I did not anticipate any trouble, but within five minutes I had a very severe irritation and itching between my shoulders. When I retired that evening I found by actual count twenty-seven white welts, about the size of a cent piece, on the back of my neck and down to the midddle of my back. Bicarbonate of soda was put on. I have found, by the way, that this is a very excellent remedy. In the morning the irritation had disappeared. But I became very suspicious of these moths. Every evening afterwards when I went out if I stayed about the lights where the moths were flying I was poisoned.

One morning I was bold enough to take a brown tail moth and to touch it to my wrist in the presence of somebody who said that they did not think that the moths had anything to do with the itch. I took this moth—and I have one with me now, and would be willing to do it again, if anybody would like to see it done—and touched it to my wrist. Inside of a minute I had a very severe burning sensation. Inside of two minutes I had a white welt as big as a quarter of a dollar. Inside of an hour I thought I was a fool, because my arm had swelled up almost to my elbow. Several times since then I have taken the hairs from the tail of a moth with very fine forceps, just as few hairs as you could see with your naked eye, and put them on my wrist or others' wrists, and have produced the irritation. I have made the experiment within the last ten minutes and have the irritation now upon my arm.

It seems to me that the hairs which make this trouble come from the tail of the moth itself, and that it cannot always hap-

pen that the hairs of the caterpillar get on to the moth when it emerges from the pupa. Of course, it is possible that when the moth comes from the pupa some of them may carry off some of the caterpillar hairs, because the empty skin that has been shed by the caterpillar is near the pupa, and the hair is all about it. That, of course, in itself would make the moth dangerous if their own hairs were not, because the moths that fly around with caterpillars' hairs upon them are just as bad as though their own hairs were concerned. In my opinion, every female brown tail moth is capable of inducing the rash with some of her own hairs.

I have here some photographs, which I have taken in the last two days, that perhaps you may be interested to see. They show the hairs from the brown tail caterpillar and from the moth, and they show that the hairs from the tail of the female brown tail moth are barbed and very fine. I have in this box a female brown tail moth that was in the act of laying its eggs, when I put benzine upon it and killed it. This egg mass is not normal, as you will see when I pass it around. Before she died she spun this little roll, as it were, of eggs. I am not an entomologist, but I am just interested in these things because they are interested in what concerns me. As the eggs were being laid, at the end of her tail I saw two little fingers, or two little palpi, that were pulling the hairs from the tail and putting them on to the eggs as she deposited them. From the middle of that little roll I took with some very fine forceps some of the hairs—and I rubbed them on to my wrist, and I can show any of you what they did. Before I rubbed them on to my wrist I examined them with a microscope and photographed them, and they were very finely barbed, as you will see in this picture.

These photographs are all magnified one hundred diameters. The one on the upper left hand side shows some of the long hairs of the brown tail caterpillar. The one on the upper right side shows the hairs from the tail of the brown tail moth, taken from the little roll of spun eggs and hairs that I have already passed around. Please be careful of those hairs. I have put a glass over them, because I don't want any of them to get out and give

you the itch, as they may if they get on to your skin. The photo in the centre is a picture of human hairs, magnified one hundred diameters, and here below are the hairs of the gypsy caterpillar, and here the hairs of the gypsy moth.

I don't know that it is anything new to you, but last winter, in looking over some of the winter nests of the brown tail moth and picking out the little caterpillars, which at that time of the year are only about one-eighth of an inch long, nearly every time I handled these nests I got the rash on my wrists and on my neck.

I would like to ask Mr. Kirkland what is the present state of the section of country where the gypsy moth first made its appearance, and also the country where the brown tail moth was first discovered. If I have been informed correctly, the first brown tail moths came into an orchard near the Somerville station on the Fitchburg railroad. I remember going by on the trains and seeing that the foliage had been stripped from the pear trees, and afterwards seeing the nests in the tops of the trees. But the other day I noticed that that orchard looked splendidly, and it did not seem that any measures had been taken to protect the treees; they had not been sprayed that I could see, and no tree tanglefoot had been put round them to prevent the caterpillars from crawling up. I have been wondering if the moths have gotten out of that locality, and of the locality in Medford where the gypsies first came, or are they still in both of those localities?

MR. KIRKLAND: In answering Professor Underwood's question, I would say that the brown tail was first brought to Somerville, and that original locality has been very thoroughly worked; in fact, the whole city of Somerville has been thoroughly worked every year for four or five years. The city, through its street department, has made a business every winter of cleaning up the brown tail on private property, as well as on the street trees. There are very few brown tail moths this year anywhere in Somerville, for the reason of the good work done last winter. The gypsy moth was brought to Medford in the Glenwood or Park

street section, and I am told, or was told in 1894, that the old trees, the old growth, there was practically all killed off. There are but very few old trees there. Now that section has been cut into house lots and built up so thoroughly that, while there are gypsy moths there, they are not worse than you would find in any thickly settled residential section in Malden, or Melrose, or Arlington.

I may have given the wrong impression. I spoke about the poisoning of the brown tail moth. I am glad that Professor Underwood has brought it out so well. Of course, I must admit, first of all, that we don't know all that is worth knowing about that particular question, and I wish some good physician or some good chemist would take it up and work it over thoroughly and go to the bottom of it. It has not been thoroughly worked out yet. There is a gentleman connected with the Harvard Medical School who is now working on that, and I have supplied him with some material. I hope he will get to the bottom of it.

I had occasion to make some microscopic examinations of the hairs of the moth. I examined perhaps a couple of hundred moths, winged moths, all told, and found on all parts of the body of the winged moth, particularly on the female, a whole lot of these barbed caterpillar hairs, but none of those hairs attached in a socket the way the scale hairs are, or the hairs which pertain to the moths. That has been simply my examination of perhaps a couple of hundred specimens, and it may be that those hairs grow on their bodies. I do know this, though, from experiments similar to what Professor Underwood has made, that I can poison myself very nicely by rubbing a female moth on my wrist. I did that at the suggestion of Dr. Hill. The male moths don't seem to poison as badly. I inferred—this was simply a matter of inference—that the female in coming out of the cocoon, which is fairly tight, has that big tail to drag through the small opening, and she has to do more struggling than the male moth does, and she consequently breaks off more cocoon hairs. Now, I have collected and handled perhaps a thousand winged brown tail moths every year with impunity. I have never had

any poisoning, except when I took pains to rub one into my wrist. On the other hand, the caterpillars and the cocoons poison me very badly; indeed, I get worse poisoning from them than from the moths.

Those are merely observations bearing on the general subject. There is need enough of some one to take up the matter and go to the bottom of it. If any of you gentlemen have the time or disposition, I would be very glad to see it done and to give you a whole lot of good material to work with.

THE VICE-PRESIDENT: Are there any further questions to be asked? This is your opportunity, having Professor Kirkland before you, brim full of the information which you want.

DR. A. L. SHIRLEY: I would like to ask the Professor, Mr. Chairman, if there has been any better remedy than bicarbonate of soda discovered for the poison of the brown tail.

MR. KIRKLAND: Mr. Chairman, there are about 1400 different remedies, and they all work well with individuals. A great many people have used a simple thing like glycerine or vaseline, and got relief from it. Others use the coal tar disinfectants, like sulpho napthol, and get relief from them. Bicarbonate of soda seems to work well with Professor Underwood. Two or three people have told me that vinegar worked beautifully with them. Here is an acid as against an alkali. One man in the office said he had great relief from simply applying alcohol externally. He thought he might try it internally the next time to see how it worked. There are a whole lot of remedies, and I should not dare to prescribe. I imagine any cooling application will give a certain measure of relief.

I might say, with your indulgence, Mr. Chairman, that at our office at No. 6 Beacon street, Boston, we have plenty of reading matter on these two insects, copies of the new law, and we should be very glad to see any of you there and to give you any information or help in our power.

PROF. THEOBALD SMITH: Mr. Chairman, it seems to me that the effect of the hairs is like that of a poison. When Mr. Underwood rubbed his wrist and mine a few moments ago there

appeared on his wrist, after perhaps two minutes, perhaps less, a wheal, which was very much like a bedbug bite, or possibly a mosquito bite. It seems to me that it would be impossible for a set of barbs to cause that amount of disturbance within that short period of time. We know that when we are pricked by thorns in the garden the pain does not begin for some time, until they are forced deeper into the true skin, and then the pain continues until they slowly are pushed out by the forming epidermis. It seems to me quite impossible to believe that we have here simply mechanical irritation to deal with. It seems as if we had some poison, something like that which is secreted by the mosquito when it stings, by the bedbug, or by ticks. In my case there was no effect produced, and I do not see why it should not have acted upon me just as it did upon Mr. Underwood, if there had not been a poison involved which selects individuals and demonstrates that there is an increased susceptibility on the part of some to this substance.

I would like to ask Mr. Kirkland why the gypsy moth does not produce similar disturbances, since these barbed hairs are present in the hairs that cover the eggs? I examined this morning very carefully under an oil immersion lens a felted mass of hair from the egg mass of a gypsy moth picked up in Somerville two days ago. There were among the more delicate hairs larger barbed hairs, with saw teeth. Why should not the gypsy moth also poison individuals, if it is simply the mechanical attachment of these hairs to the skin?

MR. KIRKLAND: I am afraid, Mr. Chairman, that I cannot answer that satisfactorily, for I presume there is a variation in these caterpillar hairs, that is, that the brown tail moth hair is much more brittle, as it certainly is finer, than that of the gypsy moth. The most notable case of poisoning from caterpillar hairs is that of the European processionary caterpillar, an insect which has much longer hair than either the gypsy or the brown tail moth. That fellow is so poisonous that cattle cannot browse in badly infested pastures. Ratzeburg, the old German entomologist, in one of his books, said that he never had been able

to make any investigation of the feeding habits of that caterpillar, because of the terrible poisoning which he received. In regard to whether it is a mechanical poisoning, or a toxine, or anythng of that sort, I have simply stated the facts. We don't know. There is no proof that has now been developed, by chemical analysis, that there is any active principle there, but that is not saying that it is not there. The natural thought is that it would be, perhaps, an organic acid, or something of that nature, as in the case of the sting of a bee or the bite of an ant, but this was not found by very careful chemical analysis. This gentleman at the Harvard Medical School, whose name has slipped from my mind, is working on the problem now, working very carefully, and making solutions, trying to produce this poisoning from some solution or culture which he hopes to obtain. I expect another year we shall know a great deal more about it than we do now. I simply stated the facts that I had at hand.

THE VICE-PRESIDENT: I would lke to say that Professor Fernald from the Agricultural College was expected to be here this afternoon and talk to us concerning this part of the subject, the barbed hair and the possible poison which seems to come from the hair in some way. If it is possible for me to secure from Professor Fernald a short paper concerning what he would have said to us, for publication in the next issue, I will do so.

DR. PERRY: I would like to ask Mr. Kirkland if there is any immunity after a person has been poisoned, whether he is just as liable to be poisoned again. I had a very severe case of brown tail poisoning, that lasted for three weeks, and since then, although I have been exposed several times, I have not been poisoned at all.

MR. KIRKLAND: Mr. Chairman, all I can say is that every time I handle the cocoon or the caterpillars of the brown tail I get badly poisoned. I don't know whether a person can become immune or not; I should rather doubt it.

I might say just one word about the way this poisoning has spread. It has spread through poor laundry arrangements, where people hang out the washing under trees badly infested

by the brown tail moth. The stockings and flannels and other garments are hung up and are infected by the blowing hairs. A case was brought to my attention in Somerville, where a man, who was working in some hot place wore a heavy flannel undershirt to absorb the perspiration. His shirt was hung under an infested pear tree that was literally swarming with brown tails. His wife ironed it carefully, turned it right side out and ironed it again. He put that shirt on, and had a good case of rash from his hips to his neck. This is a very serious thing, indeed. I have known of a small laundry that dried clothing under some infested trees, and the patrons of that laundry were very badly poisoned by certain articles in their washing.

DR. MILLER: Mr. President, I would like to ask Professor Kirkland two questions. In the first place, he told us that he had agents collecting the parasite which was supposed to destroy the moths. Will the same parasite destroy the brown tail and gypsy moth, or does it require a different parasite, and also has he had a chance to test this in this country, to see whether these parasites will destroy the moths, or is that only theoretical?

MR. KIRKLAND: Mr. President, all I can say is that several of the common enemies of the brown tail moth in Europe are also enemies of the gypsy moth. There are also some which breed in winter nests of the brown tail, which do not attack the gypsy moth. As far as getting results in this country goes, we have simply received within two or three weeks our first shipments. They are coming in about every day now. I can't say anything further, except that the parasites will be reared. They are coming in a dormant state, pupæ, as we call them. As fast as these flies emerge they will be put with caterpillars, and I can see no good reason why they won't attack them. But in the meantime, as Dr. Smith has so well put it, we must keep hammering away with the means we know to be effective. We must paraphrase the old hymn, and watch, and fight, and spray.

DR. DAVENPORT: I should like to ask the Professor as to the possibility of the parasites themselves becoming nuisances, whether the remedy may not be, perchance, worse than the dis-

ease. Then, in regard to the poisoning by the brown tail, I find that there is a great difference of susceptibility. I happen to be one of the unfortunate ones. Even during the early spring—this spring I trimmed my trees before the leaves came out—to go under any of my trees and stay five minutes and disturb trees or leaves in any way will give me itching for a week.

MR. KIRKLAND: There probably were some cocoons, or skins, or something of that sort, some refuse of the brown tail of the previous year, in your trees, and of course you naturally got poisoned by them. Now, as to the remedy being worse than the disease. The parasites are quite closely restricted to their hosts. They are adapted to breeding on these caterpillars, and some of them probably won't breed on other caterpillars. But none of the parasites which we shall bring over will attack foliage; they are all insectivorous. There will be no more danger of their attacking a staple crop or a shade tree than of a potato bug's eating up a fur coat. They are limited by nature to certain kinds of food, and they will feed on those kinds of food alone. When the food supply gives out, they will probably diminish in number until the food supply again increases. Of course, this parasite experiment, which is costing us a lot of money, may be a complete failure; we simply have not turned that stone over yet, and now we have got our levers under it and are going to turn it over and see what is beneath it.

DR. HIBBERT W. HILL: I have had the pleasure of staying in a gypsy or brown tail locality for a short time with my family, and we thought that we observed that there was likely to be an eruption of the rash during warm, dry weather, and that the eruption would be suspended if there was a heavy downfall of rain. I, not knowing much about it, supposed that was simply because it wet down the hairs and they did not blow about so much. I should like to ask Professor Kirkland if that observation has been made, and also another thing with regard to lesions other than skin lesions. My three youngsters had very severe irritation of the eyes for some days after they first went to that district and some laryngitis. I do not see why, with these hairs

blowing about in the air, they should not produce sore throat and eye lesions, as well as the ordinary skin lesions; but one seldom hears anything but the skin lesions described.

PROF. KIRKLAND: It seems quite possible that rains would wet down the hairs and prevent them from blowing about. There have been reported to my office about a dozen cases of disease or inflammation of the eye, caused by these brown tail moth hairs. I presume there have been many more that have not been reported. Dr. Loring, an oculist in Boston, is working up that whole subject. I have reported every case to him, so that he might make an investigation. There was a case which seemed to be pretty well authenticated last year of a person in Lynn, who was unfortunate enough to eat some currants, or cherries, or something of the sort, with brown tail moth hairs on them, and this person had a very unfortunate experience. The doctor that told me—I got this from a doctor, I don't know the facts—was in Lynn when I spoke there last winter, and he described this case to the audience and said the person was still quite sick and under his care. The whole thing dated back to getting mixed up with the brown tail moth and eating some of the hairs. Now, that is simply given to you as a statement made to me.

THE VICE-PRESIDENT: Knowing that we might in the course of the discussion this afternoon run across some legal question that ought to be elucidated, I invited the Assistant City Solicitor of Boston to be present. I call upon Mr. Child.

MR. SAMUEL M. CHILD: Mr. Chairman and Gentlemen of the Association, I don't know why I should be expected to know anything about the moth question. My job is to enforce the orders of the Board of Health, if the people don't obey them, after the Board has passed those orders. The only pest that I have had experience with this summer, having moved out to the country last fall, was woodchucks. I suppose I am the only living man that has shot woodchucks within the city limits. About the brown tail moth and the gypsy moth I know absolutely nothing, because they have not got out into my region, as far as I know. But it

has occurred to me in the discussion here that if these bugs are flying around so promiscuously in the summer, and are round the lights as much as they are described as being, that might be a good way to exterminate them. I was coming down town one morning and saw a man cleaning out an electric globe on an incandescent light, and he turned about a quart of insects out of the globe. That indicates that these bugs are flying around a bright light. If that is so, why won't a gasoline torch put out in the early evening, with a bright light, kill thousands of these bugs, and moths, or anything else that flies round? It seems to me you might catch a good many of them in that way. Have a light that is exposed, and not one that is in a glass globe. I understand they fly round a light very much. It seems to me if the light was out where they could get in contact with it, it would finish the bugs. I want to make that suggestion.

MR. COFFEY: Mr. Chairman, I have been wondering since this discussion opened whether the experience and the methods employed in Worcester were unique, or whether they were common to other places that have been afflicted. Last winter a visitor to Worcester made known to the residents there the fact that he had discovered several nests of the brown tail moth scattered about on the trees, and immediately the Park Department took the matter in hand and appealed to the School Department. Every principal, in every school district, was asked to announce to his pupils that the Park Department would pay a small sum to the children for a certain number of nests; I think it was a cent or two cents for five or ten nests. That was done throughout the city. They found, to their great surprise, that there were a great many of those nests scattered about the city. Those young urchins, from ten to fourteen or fifteen years of age, all over the city, in every school district, were shinning up trees. I know in my neighborhood there was a gang of about twenty or thirty that shinned every tree that there was in his neighborhood, whether there was a nest on it or not. But they effectually disposed of the moth question. Worcester has not had a single moth, nor a caterpillar, that I know of, since then. They

cleaned up the entire city, and I think I saw it announced in the paper that the cost was something like $50 or $60. Some youngsters got 25 or 30 cents out of it, but they worked there for two or three weeks thoroughly. Of course the Park Department had a lot of men at work on the streets, and looked after this, and made a sort of general oversight, went over the ground after the youngsters and picked up a stray nest here and there. But we have not had, to my knowledge, and I have not seen any announcement of that sort, a single nest escape. They thoroughly cleaned up the city last winter, along in the late winter, before the foliage appeared. I have been wondering, as I said at the start, since the discussion opened, whether Worcester was unique in that method of treatment, or whether that was common to other places and they had tried it in other places. It seems to me that it is an efficient way of disposing of the moths in the early stages.

MR. UNDERWOOD: It seems to me that our friends from Worcester and Fitchburg have children in their towns perhaps that are more industrious, more diligent and keener sighted than the children of other places, because in some instances that I have known of this work has not been well done by children. I don't think children are quite competent to do this sort of work. Some of our trees would suffer if we let the children go indiscriminately about them, cutting off the nests, and it is not always certain that they would take all the nests and always destroy them.

Mr. Child has spoken about the brown-tail moths being attracted by light at night, and he suggested the possibility of destroying them by setting up a torch where they could fly into it. I hardly think they would be attracted to any extent by a torch light.

If any of you were out in the evening during the recent moth flight you must have noticed that there were a hundred times as many moths flying about the arc lights than there were around the incandescents.

Very few, if any, of these moths seem to be attracted by the yellow incandescent light, while the intense white light of the arc seems to lure hundreds of them to it.

In Belmont when this year's flight first began our society for the suppression of insect pests had some frames made which were covered with sticky fly paper. The frames were hung over the arc lights. They were made of telegraph wire, about eight feet long and four feet high, and two feet deep and open on one side, that is they allowed the moths to come in towards the light. Cotton cloth was stretched over the wire, and to this cloth on both sides and bottom, sheets of sticky fly paper were pinned each day, fresh sheets of fly paper were put on and the old ones, covered with moths, were burned up.

The first night we caught by actual count 2000 brown-tail moths on one frame. Eventually twenty frames were put in commission, and many thousands of moths were destroyed in Belmont in this way at a comparatively small expense.

DR. PILLING: Mr. Chairman, I think the method that the gentlemen from Worcester has spoken of has proved very effective in Newburyport. It is a method that has been adopted for the last two years. They have paid the children but the small sum of seven cents per 100. The Tree Warden arranged two days a week, when he would receive these nests from the children, and if you had been out by his house you would have thought that he was surrounded by rag pickers. There were many, many thousands of nests that he got in that way, with a comparatively small expense. If my memory serves me correctly, the first day he received over 80,000 nests from the children in collecting them in this way.

DR. HOLDEN: I would like to say that I live in Melrose, which is the centre of an infested region, and a badly infested region. Very much of the discussion that we have heard here this afternoon we have heard from various societies and organizations for the last five or six years. Some of these methods are doubtless good, but I doubt very much if they will satisfy the law, which goes into operation this year, or if they will sat-

isfy the superintendent under whose care the work is to be done in the future. The method of collecting by children, the attraction by lights and by various other methods, are possibly good in their way. We had all those methods in Malden, Melrose, Somerville and Medford, and what is the result? The result is that we are worse infested with the gypsy and the brown tail this year than we ever were before. Now the law, which goes into operation this year, is a very explicit one. The work is to be done by the various cities and towns, and it must satisfy the superintendent in charge, and we shall get instruction from his office, probably, or at least the town and city officers in charge of the work will get instruction. My advice to gentlemen from the outskirts, that have not had the experience with the brown tail and the gypsy that we have, would be that they leave the experimenting with somebody else, and simply follow the law and the instructions that they get from headquarters.

DR. MCFEE: The gentleman from Worcester has spoken in regard to the method there. I would say that that experiment was tried in Haverhill, that a society of ladies made an offer to the school children of so many cents a hundred for all the nests they would bring in, and it was found that there were very large returns in a short time; the children were getting very industrious. Upon investigation it was found that these children followed up the work which was being done by the street department, that they made collections from the work that it had been doing and brought in nests that had been collected by the Street Department!

DR. KELIHER: I would like to ask Professor Kirkland what benefit he expects to result from spraying the trees; how much help that would be in abating this nuisance.

MR. KIRKLAND: The spraying that is done at the right time will practically keep the tree in good foliage for the summer, no matter how badly infested it may be. The spraying is of particular value against the gypsy moth, and of less value against the brown tail moth, because the brown tail begins to

feed at the moment the buds open. But spraying, if it is done between the 10th of May and the 15th of June, is very effective. We have now power outfits, gasoline engines with pumps attached, by means of which the street trees, and even tall elms, can be sprayed very cheaply indeed. Some city departments have sprayed average street trees at a cost of not to exceed ten or fifteen cents a tree. This is perhaps the cheapest way to handle the matter. Spraying is one good method. It is a method we can use between the middle of May and the middle of June, and after that it loses its value. It would be of no particular value to spray now for the gypsy moth, because the caterpillars have done feeding. We are going to settle the question whether fall spraying will help with the brown tail moth or not. That is an experiment which will be made this year.

I might say on this topic of having the children do the work that one great advantage is that after a boy has got a certain number of webs his big brother or his father becomes interested, and you get the judgment and the help of the older generation. On the other hand this method is open to the objection that they get the webs that are easiest reached, and neglect those which are more difficult of access. Another objection has come up in the case of one city. I won't mention any names. One city paid a substantial reward per hundred for the webs, and some budding financial genius went out to a neighboring town and organized a small crew of boys. The neighboring town was very badly infested. He collected several barrels of webs, brought them home and got the bounty. Then another objection occurs to a family man. Every now and then some boy, through an excess of zeal, or lack of judgment, or something, will fall out of a tree, and there have been a number of cases where legs or arms have been broken. I think if I had a boy of suitable age for that work I should keep him in the house and let somebody else do the gathering of the webs.

DR. STEVENS: In Professor Underwood's town I think there is a very good illustration of the benefit of spraying trees. He

probably knows the Hittinger farm, a large fruit farm in Belmont, where great pains is taken to prevent all insect pests destroying the trees and fruit. I have taken a good deal of pains to examine the trees on that farm, and I have not found one tree yet that is affected by the moth. They have thousands of trees, and they are all green. Just a fence separates their farm from other farms. The other farms are entirely stripped of foliage, and the trees on their farm are as green and perfect as any trees you could see. It seems to me that is a very good illustration of the benefit of spraying. They have sprayed their trees very early for several years, and they have not had any trouble.

The clinical side of this question is rather interesting to a doctor. It was my fortune to see some of the very first cases of gypsy moth poisoning which occurred in this state. People living on Park street, Somerville, came to me the very first season that the gypsy moth appeared, with a peculiar eruption that I failed to recognize. One day a lady came into my office, and I picked a moth off her neck. The first thing I knew I had the same sort of trouble myself. I handled the moth. I was pretty uncomfortable that day. Then I began to make inquiry, and I found that this moth was working on Park street, and that very many of the people on that street were affected. It seemed to me fair to presume that the moth had something to do with it, and we learned very soon that it did. The peculiar eruption which I saw then, and that I have seen other years, was a very different type of eruption than I have seen this year. I never had seen an eruption which seemed like ordinary urticaria until this year. Almost all the cases have had the urticaria in addition to a fine papillary rash. It comes out all over the body. It starts on the neck with this fine rash, and pretty soon they have an eruption all over the body. This seems to me more like some toxic thing than that it is all due to the irritation of the hair from the moth.

Another thing that has occurred to me; this year I have seen quite a number of people who have been very ill from the moth

poisoning, so that they have been confined to bed for two weeks. One case was that of a nurse. She had a temperature of 105 and was very ill. She was in bed for two weeks with an eruption more extensive than I had ever seen. She was covered from head to foot. She was in the town of Arlington, in a sanitarium, and all the people living there were very much affected. It is one of the most affected districts in Arlington off of Pleasant street. This woman was greased over and bathed with all sorts of things. She had to be in bed, with a nurse, in fact with two nurses. She got better, and went back to her patient, but came down again with the same thing. She got better again, and on making another visit to the same locality she had a third attack. Then she took to the woods, thought it was no use to go there any more. So in her case certainly there was no immunity.

Now we all know that there are very many people who are perfectly immune from ivy poisoning, or dogwood poisoning, and there are others so susceptible that if they go through the centre of a street where ivy is growing on the wall they get poisoned. A great many people are poisoned by a weed which is called the nettle; I don't know the botanical name. A great many people are very seriously irritated by that. Other people may handle it without the slightest trouble. So that the susceptibility is probably the same from this poisoning as it is from other things, as the Chairman has said.

THE VICE-PRESIDENT: The next quarterly issue of the Journal of this Association will be sent to all boards of health, and will contain the full text of Professor Kirkland's address, and also the discussion, so that each member of the Association and each board of health within the Commonwealth will have at hand such information as we have secured this afternoon for their guidance.

DR. PALMER: I move that the thanks of the Association be extended to Professor Kirkland for his very interesting and instructive address.

DR. MILLER: It gives me great pleasure to second that mo-

tion. I am sure we have all been very much interested and benefited. It gives me great pleasure to second the motion.

The VICE PRESIDENT: It is moved and seconded that a vote of thanks of the Association be tendered to Professor Kirkland for his able and interesting address this afternoon.

(The motion was adopted, and, on motion of Mr. Coffey, the meeting adjourned.)

PREVENTIVE THERAPEUTICS.

By Herbert D. Pease,
Director Antitoxin Laboratory, State Department of Health,
Albany, N. Y.

DIPHTHERIA ANTITOXIN IN THE PHARMACOPOEIA

The Eighth Decennial Revision of the Pharmacopoeia of the United States, which has just appeared, contains Diphtheria Antitoxin (*Serum Anti-diphthericum*) as an official remedy. The official description of this remedy given below is based on a report of a special committee appointed for the purpose of drawing up a statement concerning its nature and the estimation of its strength as well as its proper dosage.

"Serum antidiphthericum, antidiphtheric serum, diphtheria antitoxin, a fluid separated from the coagulated blood of a horse *Equus Caballus*—Linne, immunized through the inoculation of diphtheric toxin. It should be kept in sealed glass containers, in a dark place, at a temperature between 4.5 degrees and 15 degrees C. (40 degrees and 59 degrees F.)"

"A yellowish or yellowish-brown, transparent or slightly turbid liquid, odorless or having a slight odor, due to the presence of the antiseptic used as a preservative. Specfiic gravty: 1.025 to 1.040 at 25 degrees C. (77 degrees F.)."

"Antidiphtheric serum gradually loses its power, the loss in one year varying between ten and thirty per cent. Each container should be furnished with a label or statement giving the strength of the Antidiphtheric Serum, expressed in antitoxic units, the name and percentage by volume of the antiseptic used

for the preservation of the liquid (if such be used), the date when the Antidiphtheric Serum was last tested, and the date beyond which it will not have the strength indicated on the label or statement."

"The standard of strength, expressed in units of antitoxic power, should be that approved or established by the United States Public Health and Marine Hospital Service."

"Average dose, 3000 units."

"Immunizing dose for well persons, 500 units."

Attention should be called to one or two points in this description. First that the antitoxin gradually loses its power, and that the loss may be as high as 30 per cent in one year. This figure is undoubtedly too large for most antitoxins. Miller (Centralblatt fur Bakteriologie Abt. I, 1905, vol. 38, p. 233) has shown, and the writer's experience confirms his statement, that the large majority of antitoxins lose but little of their specific strength in one year, and that a large number have lost but little during two years. It is important to realize that diptheria antitoxin does not deteriorate in any other way than this gradual loss of strength. It is claimed by Escherich and others that the older antitoxins are less likely to cause the serum urticarias and other skin disturbances, than those recently obtained from the horse. It can be safely concluded that an antitoxin last tested a year ago, and which has been properly kept in a cool, dark place, will contain the strength which it contained when it was issued. The second noteworthy point is the standard of strength of the antitoxic unit. The standard adopted by the U. S. Public Health and Marine Hospital Service is one based on Ehrlich's normal serum.*

Bottles of the standard unit serum are now regularly distributed to the licensed manufacturers in this country at stated periods, and these are utilized for the standardization of diphtheria toxins used to test the strength of antitoxins. All manufacturers have access, therefore, to the same standard for testing their antitoxins.

*Rosenau, Bulletin, Hyg. Lab., U. S. Pub. Health and Marine Hosp. Service, No. 21, April, 1906.

The third important point is the dosage. It should be noted that 3000 units is stated to be the average dose. Much larger doses may be and certainly should be used in severe cases, and should be repeated until convalescence is definitely established.

THE TREATMENT OF SCARLET FEVER WITH ANTISTREPTOCOCCIC SERUM—In view of the reports of Escherich, of Moser and others, of the very favorable results obtained by them in the treatment of scarlet fever with antistrepto coccic serum, prepared by Paltauf according to Moser's ideas, it is of interest to consider the reports of others who have used this and other antistreptococcic sera in similar cases.

Mendelsohn† administered Aronson's serum in 165 cases and Moser's in four cases of scarlet fever. In some of the former cases the serum was injected directly into the tonsils, and the author seems to think well of that method of administration.

He considers the effect of the serum injections under two heads, first, the influences upon the cause of the disease in its acute form, and second, the effect upon the complications.

The author states that he failed to note any essential alteration in the course of the true scarlet fever symptoms which were due to the serum injections. In his further elaboration of this point he claims that the temperature courses in this disease are of two types, one in which the fall is rapid and the second shows a prolonged gradual decline. In 126 of the first 165 cases these two types of temperature curves were uninfluenced to any marked extent by the serum injections. He furthermore calls particular attention to the similarity between the first or rapid type of temperature decline, to those temperature curves shown by Moser and Escherich, who attributed the rapid decline to the injections of the Moser serum.

Concerning the influence of the injections upon the usual complications, the author states that they were apparently without any marked preventive influence. He claims that if the character of a given epidemic concerning the frequency of these complications, is taken into consideration, the power of the serum to prevent them is not strongly manifest.

†Deutche Medicinische Wochenschrift, 1905, vol. xxxi, p. 461.

Eighteen of the 165 cases ended fatally, and the majority received large doses early in the course of the disease, which was of a malignant or septic type.

Of the four severe cases treated with Moser's serum only one was apparently benefited, and in none was the course of the fever definitely influenced.

Gaughofner* used Aronson's serum in fifteen cases of scarlet fever, all but two of which were of a very severe type. Seven terminated fatally.

While a fall in temperature folowed the administration of the serum in some cases, the fall was usually followed by another increase. The author doubts the influence of the serum in such exacerbations. The Moser serum was used in eight very severe cases of scarlet fever, and five died, one within twelve hours of the injection. Only two were injected on the first and second days of the disease, and both of these patients recovered. The course of the disease in the other cases was not definitely altered nor were complications prevented by the serum.

The author states that he observed no such sudden falls in temperature after the injections as have been described by Moser, Escherich and others. He concludes that he cannot definitely say from these small series of cases that either serum has a definitely beneficial influence on the scarlet fever processes.

Quest† reports the treatment of twenty-one cases of scarlet fever, in which eleven were given antistreptococcic serum prepared by Bujwid, and the other ten that of Moser. The former serum is prepared according to the Aronson method. Of the former eleven cases two died. The course of the temperature was affected in but two instances and markedly in only one. Of the second ten cases three died, two soon after injection, and the third had tuberculosis as a complication. The temperature dropped within twenty-four hours after the injection of two patients, but rose again on the fourth day later. But few of the patients experienced a general betterment of their condition.

*Deutsche Medicinische Wochenschrift, 1905, vol. xxxi, pp. 529, 592.

†Deutsche Medicinische Wochenschrift, vol. xxxi, p. 988.

The skin disturbances of the disease were never prevented, but in some cases were intensified.

There was no difference in the course of the disease in three sisters, one of whom received the Bujwid, another the Moser and the other no serum whatever.

In only one case were the sequelae apparently prevented or influenced.

The author considers the series too small to warrant definite conclusions, but he does not consider the advantageous working of the serum to have been demonstrated.

ANTIPNEUMOCOCCIC SERUM IN PNEUMONIA.—Knaugh* administered the Romer antipneumococcic serum in seven cases of croupous pneumonia in the Royal Garrison Hospital at Wurzburg. Romer serum is a mixture of the sera of horses, cattle and sheep, which have been actively immunized with many cultures of pneumococci isolated from infections in man.

The doses used were 20 c. c. and were repeated one or more times.

The author states that there were no unfavorable or harmful effects noted which were due to the injections.

The pulse, temperature, respiration and general condition were all favorably influenced by the treatment. A rapid, decided fall in temperature was observed in but one case in which the serum was given early in the course of the disease. In the others the temperature fell gradually. Convalescence pursued a normal course in all the cases.

A CURATIVE SERUM FOR TYPHOID FEVER.—Stokes and Fulton† have recently made a most complete and detailed report of their work begun several years ago on the production of an antityphoid serum.

Progressive doses of living virulent typhoid bacilli were injected subcutaneously into four hogs. In three single strains of bacilli and in the fourth different cultures were employed at different times, thus producing a so-called polyvalent serum.

*Deutsche Medicinische Wochenschrift, 1905, vol. xxxi, p. 452.

†Journal American Medical Association, 1905, vol. xliv, p. 1504.

The serums obtained from these hogs were tested for their protective value on guinea pigs, which were subsequently given definite and certainly fatal doses of either dead or living typhoid bacilli. The agglutinating and bactericidal power of these serums were also tested.

In the tests of the serums' protective power the results showed that from 1-600 to 1-800 of the guinea pigs body weight of serum would protect them, when injected subcutaneously, from four times the certainty fatal intraperitoneal dose of the typhoid bacillus. The serums also showed marked agglutinating and bactericidal powers.

These serums were administered to twenty-three patients having typhoid fever. Two of the series died, of which one was from secondary streptococcus septicaemia.

In fifteen of the cases the favorable result was contributed to by the use of the serum injections. The authors conclude that they believe "that by the use of this serum the febrile period may be shortened and the daily variation may be favorably modified."

MUNICIPAL SANITATION.

By Charles .V Chapin, M. D., Superintendent of Health, Providence, R. I.

SPIT SIGNS.—In Providence there have recently been placed, at frequent intervals on the principal streets, signs bearing the following inscription: "Do Not Spit on the Sidewalk. Fine Twenty Dollars."

These are enamelled signs, with blue letters on a white ground. They were made by the Baltimore Enamel & Novelty Co., and signs 8x10, lettered on one side, cost $23 per hundred. The cost of putting up the signs was nearly as great as the signs. These signs seemed to meet with popular approval, and there was considerable demand for them even in the poorer sections of the city.

Since the signs were put up, some six weeks ago, there has been a great falling off in the spitting habit, and there is now very little spitting upon the sidewalk.

SMALLPOX IN LEICESTER, ENG., IN 1904*—Leicester is a city of nearly 200,000 inhabitants, a large proportion of whom are opposed to vaccination, and are as a consequence unprotected. An outbreak of smallpox began in December, 1902, and continued practically without interruption until August, 1904. In all there were 715 cases with 21 deaths. It is interesting to note that in an unvaccinated city and with very little public vaccination (only 5488 public vaccinations were performed in 1903 and 1904) the outbreak assumed no more alarming proportions than in many other cities of England and the United States where public vaccination is vigorously prosecuted. But there is no warrant for taking this history as a vindication of the "Leicester method" of fighting smallpox, i. e., by isolation alone. While outbreaks may be stamped out by this method, better results will in the long run be obtained if vaccination can be pretty generally performed. While the population of Leicester are antivaccinationists, their efficient and progressive health officer is a thorough believer in the efficacy of vaccination as a preventive of smallpox. But he recognizes that even an approximately efficient vaccination of his city is impossible, and he wisely calls attention to the futility of the vaccination of chldren alone as a means of rendering a community immune.

Many of the observations in this report are merely in accord with universal experience in smallpox and vaccination, but a few are novel or of especial interest. Thus the value of vaccinating contacts is shown statistically. Of 707 inmates of houses where there was smallpox, 533 submitted to vaccination, out of these 4.8 per cent were attacked; 174 refused vaccination, and of these 20.6 per cent were attacked.

It is refreshing to find Dr. Millard questoning the effect which vaccination has had in the diminuton of smallpox mortality. That it is due largely to vaccination is doubtless true, but that more efficent isolation and decreased fatality have played an important part is perhaps equally true. That the inherited effects of vaccination, either upon the human or the

*Report on Small-pox Epidemic, Leicester, 1904. C. Killick Millard, M. D.

smallpox organisms have mitigated the severity of the disease there is not the slightest evidence.

The importance of unrecognized cases in causing smallpox, and indeed all contagious diseases, is now generally acknowledged, and data illustrating this are given in the report. Thus five of these cases gave rise in four weeks to a nest of forty. In houses where the initial case is recognized 8.3 per cent of the contacts are attacked, but when the initial case is not recognized 63.6 per cent are attacked.

Tramps are considered an important factor in the dissemination of smallpox in England as in this country, and Dr. Millard suggests that applicants for municipal lodging should be required to show a certificate of revaccination or be vaccinated. This may be feasible in England, but the impossibility of securing uniform legislation in all our States would interfere with its success here. There is considerable variation in England as in the United States, in the mode of treating contacts. Sometimes they are strictly isolated and sometimes they are allowed to go at large or attend to their business, subject, however, to daily inspection. In Leicester they are not allowed to work, but receive some compensation from the city. In the epidemic in question the total amount so expended was £372. It is claimed that under this plan they are much more obedient to rules, less likely to conceal themselves, or remove from the city.

ACUTE INFECTIOUS DISEASES.—Under this title* William M. Welch and Jay F. Schamberg have recently published a volume of great practical value to all sanitary officers who have anything to do with contagious diseases. The work is restricted to the more common and directly contagious diseases, as the authors explain, to those with which they have had large personal experience. This experience is indeed large, for the authors state that there have come under their personal observation 9000 cases of smallpox, 9000 of scarlet fever and 10,000 of diphtheria. Such a wealth of clinical material ought to furnish much that is novel and instructive, and the reader is not

*Acute Infectious Diseases, Lee Bros. & Co., 1905; p. 765. $5.

disappointed. The diseases treated of are vaccinia, smallpox, chickenpox, scarlet fever, measles, German measles, typhoid fever and diphtheria. The etiology, pathology, symptomatology, diagnosis and treatment are all very fully considered, but the strongest and most voluminous part of the work is that relating to symptomatology and diagnosis. A description of typical cases of these diseases is to be found in all text books, but none that the reviewer knows of, not even monographs, deal so exhaustively, and yet with such discrimination, with typical features, which after all are really very common, and are daily brought to the notice of health officials. Thus to take an instance at random, the slighter and more evanescent but yet common types of scarlet fever eruptions are very fully discussed and the points of resemblance to and difference from other rashes carefully described. The desquamation of scarlet fever is described with equal care, and is given its proper diagnostic value. Attention is called, as it rarely is in text books, to the peculiarly characteristic desquamation of the finger tips. The authors warn against the very deceiving character of the desquamation seen in other affections. There are a large number of photographic illustrations, most of which are excellent, and are of great assistance to the reader. There is little to criticise in the work, though the part relating to preventive measures is hardly up to the rest, and the index is not as good as such a valuable work deserves. It is certainly a book which no health officer can afford to be without.

SANITARY ENGINEERING.

By Robert Spurr Weston, Assoc. M. Am. Soc. C. E.

ACTION OF COLLOIDAL SOLUTIONS OF COPPER UPON B. TYPHOSUS.*—It has been demonstrated that when water containing typhoid bacilli was allowed to stand in a copper vessel the typhoid fever bacteria perished within one hour. In vessels made of other materials the bacteria persisted at least for three, and in vessels of some kinds for more than twenty-four hours.

*A. H. Stuart, Am. J. Med. Sci., 129, 760-769. Reviewed by F. P. Underhill, Review of Am. Chem. Research, p. 419-420.

"Raw tap water in glass vessels showed an increase in the number of organisms in three hours. Raw tap-water in copper vessels in one experiment showed a diminution from 384,000 germs per cubic centimeter to 18,000 per cubic centimeter in three hours. Raw tap water containing large numbers of river organisms and considerable vegetable matter, when inoculated with millions of typhoid organisms and placed in a copper vessel, showed that the typhoid bacilli were killed in one and three-fourths to two and one-half hours. Water containing colloidal copper has a more rapid toxic effect upon typhoid than upon river water organisms. The quantity of colloidal copper given off from a one liter copper vessel in three hours was one part in four million. This amount killed off the added typhoid organisms in from one and three-fourths hours to two and one-half hours, and clinical experience has shown that this amount of colloidal copper is harmless when taken into the human system."

COPPER AS AN ALGICIDE AND DISINFECTANT IN WATER SUPPLIES.*—This bulletin is the second one published by the authors, and gives an account of the experiments and practical results which have been obtained since the publication of the first well-known bulletin (reviewed in this Journal.)

During the summer of 1904 over 50 reservoirs were treated for the purpose of eradicating algae, and the results show that much greater dilutions of copper suffice than was thought to be the case when the first reports were published. For example, it has been found that dilutions as great as 1 in 25,000,000 suffice to destroy Spirogyra, and that Uroglena is destroyed in dilutions of 1 in 20,000,000. A table is published by the authors, who recommend that the amounts of copper given in the table for the destruction of different organisms be increased by 2.5 per cent for each degree below or above 15 degrees C., and to high alkalinity due to carbonates.

Experiments were made to ascertain the effect of copper up-

*George T. Moore and Karl T. Kellerman, U.S. Dept. of Agriculture, Bureau of Plant Industry, Bulletin No. 76. Reviewed by L. P. Kinnicut in Review of Am. Chem. Research, p. 353.

on fishes of certain species. These experiments showed that some extent for waters containing organic matter and having trout for example are injured by dilutions of 1 to 7,000,000, while black bass will stand dilutions as strong as 1 to 500,000.

A large part of the report is taken up with a discussion of the action of copper sulphate and metallic copper on the typhoid bacillus. The report of Dr. Kendricks Smith, giving an account of the successful application of copper sulphate to the city water of Columbus, O., in removing B. coli, and the lowering of the typhoid fever death rate, and the report by Mr. John Weinzert of Albuquerque, N. M., of an epidemic, which was repulsed probably by the use of copper sulphate, form part of the bulletin.

An account is also given of the experiments made in connection with the rapid water filter plant at Anderson, Ind. These latter experiments showed that when copper was used in conjunction with the sulphate of alumina, used as a coagulant, the B. coli was practically absent. Where the usual coagulants were employed it was generally present in each cubic centimeter of the filtered water.

The authors unqualifiedly recommend copper sulphate as an effective and practical means of sterilizing water polluted with certain pathogenic bacteria, and as an emergency method they say that it is applicable to both household and municipal conditions. They cite many authorities to show that the amounts of copper used are harmless. They hold that it is a natural constituent of the body, and in minute quantities has no effect upon the human organism.

The matter contained in this bulletin is of supreme interest, and the authors are to be congratulated on placing in the hands of sanitarians and engineers a tool which undoubtedly will prove most useful in certain emergencies, and where it is guided by competent hands.

FRENCH TYPHOID STATISTICS.*—The average typhoid fever death rate decreased from 26.4 per 100,000 in 1886

*Dr. Imbeau, City Engineer of Nancy. Eng. News, 54, 1905, 62.

to 20.14 in 1903, due to progress in public hygiene. Cities with improved water supplies and sewerage show greatest diminution. Death rate still too high; should not exceed 16 or 17 in any European city.

IMPROVED WATER SUPPLY FOR SPRINGFIELD, MASS.—Mr. Allen Hazen, M. Am. Soc. C. E., in a recent report recommends that the future supply of the city be developed on the Little River. His plan embraces a 6,000,000,000 gallon reservoir, conduits, filtration plant, supply mains and a 30,000,000 gallon distributing reservoir. The yield of the system would be 15,000,000 gallons daily at present, 30,000,000 gallons in the future. The construction for the lesser supply would be $2,177,000, including $350,000 for filters.

VITAL STATISTICS.

By John S. Fulton, M. D.,
Secretary Maryland State Board of Health, Baltimore, Md.

Chicago statistics, under the new commissioner of health, promise to be irritating, rather than amusing as they formerly were. They will be no more instructive. The score card has always been more interesting than the game in Chicago. I have now and then aimed a little ridicule at the Windy City's flatulent statistics, and others have done likewise, but without disturbing in the least the hurrah boys of Chicago. The Bulletin of July 8th contains some numerical illusions by the new commissioner. He says that the death rate of New York for the half year (19.40 per 1000) is 37.6 per cent higher than that of Chicago (14.09 per 1000). It would have been just as easy, just as unfair, and much less impressive, to have said that the death rate of Chicago is 27.4 per cent. less than that of New York. For many years the Health Department of Chicago has used this stock illusion, exploiting the vagaries of percentage, and always printing the larger of the two unmeaning statements possible to this mode of statement.

The new commissioner offers a novelty in his suggestion that the population of New York is "estimated," while "Chicago's is *fixed* by the U. S. Census Bureau." Here is an amateur for you, letting fly a missile through his own glazing. If Chicago methods had been employed in the recent census of New York the population figures of New York would have been better "fixed" than those of Chicago. If Chicago had been content with modest inflation of her population count, the row in which the Census Bureau proved a winner, might never have occurred, and so the city might have avoided the painful necessity which she has since made over into a virtue.

Another bad fling of the new commissioner is aimed at the two cities which have done better than Chicago in the matter of smallpox during the last six months. Chicago has had 52 deaths from smallpox in that time, and New York has had 8. Expressed Chicago-wise, New York's advantage is 550 per cent, though the commissioner does not make a percentage statement of this comparison. He says instead: "Every case of this disease (smallpox) occurring in Chicago is diagnosed by experts, and is reported as smallpox if it proves to be so, and not as 'chickenpox,' 'Cuban itch,' etc." The city which excels New York is not named. Perhaps it is a certain coast city which has had no smallpox at all for a year. Such a city would be a fairer mark than New York for insinuations about diagnosis. The large city having a perfectly clean smallpox sheet; though well known to me, is not mentioned, because, for all I know, there may be another large city as fortunate. However well Chicago may rank in the past six months, her smallpox record for six years is not so good as that of Boston, New York, Philadelphia, Buffalo, Baltimore or Washington. The history of the past several years shows few and short intervals when smallpox has been absent from Chicago, and the record as a whole, though creditable to the wretchedly financed health department, is disgraceful to Chicago.

The old plan of analyzing Chicago's special mortality figures, and displaying them against the corresponding data for New

York, is continued by the new health commissioner. For instance, the infant mortality of the two cities, figured on a population basis, gives Chicago an apparent superiority in the ratio of 60 to 43—a superority of 39 per cent by Chicago arithmetic. The same figures show that Chicago has 30.88 per cent of her total mortality under 5 years, and New York 30.97 per cent in that period, so that New York need not feel humiliated by Chicago's apparent superiority in the matter of infant mortality. It cannot possibly be as large as 39 per cent, and may be as small as 3-10 of 1 per cent.

The consumption figures, as published, seem disadvantageous to New York in the ratio of 23 to 17, but on percentage of total mortality the advantage lies the other way: 11.8 per cent. of the total mortality in New York, and 12.21 per cent. in Chicago being due to consumption.

The printed pneumonia figures show a less mortality rate in Chicago (23.65 per 10,000) than in New York (30.78 per 10,000), or 30 per cent superiority for Chicago. Both cities have printed much nonsense about pneumonia, but the score is still in doubt, for the same figures which, applied to the population, give Chicago an apparent advantage of 30 per cent., when applied to the total mortality, show that Chicago attributes 16.9 per cent of her deaths to pneumonia, while New York charges only 15.8 per cent. to this statistical man of straw. The inversion of Chicago claims by the simple means of stating them on a total mortality basis, might be explained on the ground that fewer causes produce the mortality of Chicago. That indeed is true, for New York recognizes 179 causes of death among her population, while Chicago recognizes only 178. This single cause of death, slightly effective in New York, wholly inoperative in Chicago, cannot fully explain the curious results obtainable from the mortality data of Chicago, and one naturally looks to Chicago to solve her own conundrums.

A statistical illusion of a sort too crude to be attempted in Boston, let us say, but good enough to be tried at moderate intervals in Chicago, is found in the Bulletin for July 22. Speak-

ing to the verse from Genesis concerning the duration of man's earthly life, "his days shall be a hundred and twenty years," he says: "And here in this good city of Chicago— despite its crudeness and present limitations—this promise of the Lord is being more nearly fulfilled than in any other of the cities of the earth. In the year 1873, when Dr. Reilly's anticipation was published, there died 9557 out of the 360,000 inhabitants of Chicago—a ratio of 276 in every 10,000. In 1904—thirty-one years later—the ratio of deaths was only 136 in every 10,000. In 1873 the aggregate ages of those who died summed up 146,222.1 years; the average age at death in 1873 was, therefore, 15 years and 4 months. The aggregate of the ages of the 26,311 who died last year was 855,167.5 years, and the average age at death was therefore 32 years and 6 months. In a single generation the death rate of Chicago has been reduced one-half, the duration of life within its boundaries has increased two-fold."

A comparison of the average age at death in 1873 with the average age at death in 1904 furnishes no evidence whatever of increase, or even of alteration, in the average duration of life in Chicago during the past thirty years. A rise in the average age at death between 1873 and 1904 has no significance at all as to the progress of hygiene in the interval. The figures mean something to the advantage of Chicago, to be sure, for they certainly do indicate that the average citizen of Chicago is taller in 1905 than he was in 1873, and has proportionately larger feet. His intelligence, however, has not kept pace with his physical development, if the figures offered by his health commissioner mislead him into believing that the average duration of human life has doubled in Chicago during the last thirty years. To point out the fallacy in this argument from the average age at death is a kindergarten task, and not to be done in these pages. The same atrocious nonsense has been published before in the Bulletin of the Chicago Health Department, without exciting merriment, and its repetition justifies a suspicion that Chicago has no specific levity for figures.

It is pleasant to turn from the vagaries of a long established

registration office to consider the first efforts of a new one. The report of the State Board of Health of Florida is just out. The awakening of the South to the fundamental importance of vital statistics is most gratifying. Florida presents in her sixteenth report the first serious attempt to register marriages, births and deaths. The legislature has not been asked to pass a law on the subject, for the State Board of Health has the authority to make its own regulations. The recommendations of the committee of the American Public Health Association, published in Census Bulletin, No. 21, have been followed, and good results should be obtained, if it is possible to register vital statistics without the aid of a statute.

Without a State law, and under regulations of the Board of Health, Florida has registered in the first year (1904) 3898 deaths and 7154 births, giving rates of 7.42 deaths and 14.1 births per 1000 population. The registrar recognizes and proclaims the incompleteness of these results. In a population of little over half a million, mostly rural, the results promise well. The results for the State are at least consistent, indicating about equal shortage in the registration of births and deaths. In some counties the returns must have been nearly complete. Monroe County, having a population of 18,000, shows a birth rate of 41.2 and a death rate of 26.3 per 1000. This is a perfectly consistent exhibit, and doubtless represents the best local registration done in the first year of Florida's experience. Duval County, population 39,743, the largest county in the State, shows a death rate of 23.98 per 1000, and this indicates the next most successful attempt at registering deaths. When registration in all the forty-five counties of Florida have reached the efficiency of Monroe and Duval Counties, the Census Bureau will, in all probability, admit Florida to the company of "registration States." Though in doubt whether this can be done without the aid of a special act of Assembly, here is hoping that Florida may be the first of the Gulf States thus recognized.

LABORATORY WORK.

By Prof. F. P. Gorham, Brown University, Providence, R. I.

STANDARD METHODS.—The movement toward the adoption of standard methods in all laboratory work is certainly to be commended. In order to make the researches of various laboratories comparable some such scheme is necessary. The report of the Committee on Standard Methods of the Laboratory Section of the American Public Health Association has just appeared, and in connection with this report, in fact admirably supplementing it, will be the report of the committee appointed by the Society of American Bacteriologists in regard to standard methods of describing bacterial species. The preliminary report of the latter committee is about to be submitted to the bacteriologists of the country with request for criticisms and suggestions, before the final report is published.

The full report of the committee will be sent to all members of the Society of American Bacteriologists, to all members of the Laboratory Section of the American Public Health Association and to all others who apply or who are known by the committee. The committee consists of F. D. Chester, Delaware College, Newark, Delaware; F. P. Gorham, Brown University, Providence, R. I.; E. F. Smith, U. S. Department of Agriculture, Washington, D. C.